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> CreutzFest Brookhaven September 4-5, 2014



or

How I Got my Start in Nonperturbative QCD



or

How I Got my Start in Nonperturbative QCD

A Story Unknown



Fundamental Parameters from Lattice Calculations. LQCD II DoE Review. January 30,31, 2008, Germantown,, MD.. 2

or

How I Got my Start in Nonperturbative QCD

A Story Unknown

(even to Mike)



QCD in the late '70s

- QCD was invented in 1973, and lattice QCD almost immediately thereafter.
 - In the late 70s, Wilson was working on relatively formal topics, implementing chiral symmetry in lattice QCD.
 - Others were attempting hadron calculations with strong coupling calculations of uncertain reliability.
- As a graduate student at Cornell then, lattice QCD made an enormous impression on me as a way to understand what renormalization, anomalous dimensions, and beta functions were,
 - not as a way of actually calculating things.
 - I did as my thesis a difficult perturbative QCD calculation.

- The practical achievements of QCD in the '70s were short distance calculations done with perturbation theory.
 - QED experts found that the methods in which they were expert could be applied to very interesting QCD problems as well.
- In PQCD circles at the time, one often heard statements like, "The moments of structure functions are nonperturbative and incalculable, but the q² evolution of the moments can be calculated with QCD".
- At Cornell we were taught that this was pernicious nonsense.
 - There was one QCD. DimReg perturbation theory approximated it well at short distances; lattice QCD would eventually solve it everywhere.
 - But for the time being, little could be calculated.

The '79-'80 revolution

- In 1981 when I finished my thesis, I found that a revolution had occurred:
 - M. Creutz had introduced Monte Carlo methods to lattice QCD and had shown how to calculate a physical quantity, the string tension.
 - Others had shown how Monte Carlo methods could be used to calculate the hadron spectrum.
- Someone gave me a copy of one of Creutz's programs, and as a postdoc at Fermilab I began to study it.
 - The program made an huge impression on me, and I began to consider it something very beautiful.

What was this earth-shaking program?

What was this earth-shaking program?

PROGRAM-LAFFICE(INPUT,OUTPUT)		·····	00015
COMMON/VAR/8, ISIZE, MDOWN(10), MUP(10), IPOWER(5), APQ		000160
			000170
COMMON/VAR2/ALAT2(40000)		,	000180
LEVEL2, ALATI, ALAT2			
CUMPLEX ALATI, ALAT2			000200
-*-LATTICE=ISIZE*ISIZE*ISIZE*ISIZE			000220
* INVERSE TEMPERATURE = B			000230
-*-SUBROUTINE MONTE(I) GIVES I MONTE CARLO ITERATIO	NS-PER-LI	NK	
*MUP AND MDOWN ARE DIMENSIONED TO ISIZE			000270
→DO-NOT-RUN WITH-B=0	ana		000280
ISIZE=10		··.	000290
B=2-6			000300
NMAX=ISIZE			000310
DUSN=1.9NHAX			
MUP(N) = MOD(N, ISIZE) + 1			000330
D-MDOWN(N)=MOD(N+2+ISIZE+ISIZE)+1		\$1.990 TALEN BOT IN COMMON & LOCATION (1)	000340
006N=1,5			000350
-6			000360
MP=4+1S1ZE++4			000370
UU67M=1+M			
ALA[1(M)=1			000390
· · · · · · · · · · · · · · · · · · ·			000400
CALL MONIE (30)			000410
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SUBROUTINE MUNIE (TER)			000590
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			000610
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COMPLEY ALATI ALATE UTATE ANEWS ANEWS ANEWS			000630
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60MPLEX AL2S2 A24S2 A45S2 A34S11A45511	A126519A1	3451	000650
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TEMP=12B	a serie and a series of the series of		000680
nosinites			000690
SUM=n	1		000-700
*** \$ 5 F-F Free WOAD Same and a second and a second secon	\$ P	n Allowiy	000710
MA==1POWFR(2)=1POWFR(3)=1POWFR(4)=1POWFR(5)	· 0.2	IPM I	000720
		l	000730
$0050JS=1 \cdot ISI7ESX(2) = JSSMC=MB \cdot JSSTPOWER(2)$			000740
DUSAKS=1-ISI7E3X(3)=KSAMD=MC+KSATPOWER(3)			000750
00501 S=1 ISI7ESX(4) = 1 SSM = 000 SSM Constraints			000700
** SELECT-LINK		······································	000770
00 50 Il=1,4	2 ~	×h	000780
UINT1=UINT2=0			000190
*LOCATE NEXT SITE IN II DIRECTION	Ln		000000
M45=IPOWEH(11)*(MUP(X(11))-X(11))			000010
M5=M1+M45	1	115 - 15	000020
	· · ·	C12 X 3	000830
L15=M1+I1IP5			000850
-*LOOP-OVER-PLANES-CONTAINING-LINK			000000
D01J2=1,3\$I2=MOD(I1+J2-1,4)+1	3 x	x 11	000870
+LOCATE-NEIGHBORING-SITES AND LINKS		~ 4	
M2=M1+IPOWER(I2)*(MUP(X(I2))-X(I2))			000800
M4=M3+M45			000910
L12=M1+I2IP5		. .	000930
L31=M3+I2IP5			

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	4-44-MALLITOC	. 7	
	145-M4+13105		-000950-
Jame		÷	000960
			-000970-
-+04-			000980
• - •			-000990-
4.73.20 mile and		i	001000
	A34S1=ALAT1(134)\$A34S2-ALAT2(124)		-001010
	A45St=ALAT1(L45)SA46S2-ALAT2(L34)	1	001020
	A6551=CONJG(ALATI(156))\$A6552ALAT2(157)		-001030
6.6 million	Al3S1=CONUG(ALATTH) + CONUGS2 - ALAT2(L3C)		001040
*MUL	TIPLY INTERACTING SPINS		-001050-
and the Samula and			001060
	A126S2=A12S1*A26S2+A12S2*CONJG(A26S1)		-001070
*******			001080
	A134S2=A13S1*A34S2*A13S2*C0NJG(A34S1)		-001090
111 - M. IN. H. H. H.		24	001100
	C +A126S2*CONJG(A65S2)	1.	-001110
-	-C-+A134S1*A45S1	Če .	001120
	C -A13452*CONJG(A4552)		-001130-
		1 1	001140
	C +A12652*CONJG(A6551)	:	001150-
Bare that free an			001160
	C +A134S2*CONJG(A45S1)		001100
~_ <u>j</u>	CONTINUE	!	001180
*SEL	ECT NEW GROUP ELEMENT		001200
and a consumer.			-001200
	UMAGIN=1/UMAG	!	001220
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	OME2B=1-EXP(-2*B*UMAG)	i.	001230
6	AU=1:+ALOG(1:-OHE2B*RANF(0))*BAG OMC20 = AMWI (1. E+2*2MA)		-001240
	RAD=1+A0**2		001260
114-113-1507-2000-000000			-001200
	$A_3 = SQR1 (RAD) * (2 * RANF (0) - 1,)$		001280
8	AL=RANF(0)-55A2=RANF(0)-5		-001200
	AMAGEA12982+A2882		001300
20000.23 x 9440.445 x	Tr (AMAGGU) \$25,00108		-001310-
	ANEWI=CMPLX(A0,A3)*UMAGIN	1	001320
	ANE #2=CIPLA (A2;A1) ~ (UMAGIN*SQRT((1A0**2-A3**2)/AMAG))		-001330-
	ALATI(LIS) = ANEWI*UINTI-ANEW2*CONJG(UINT2)	i.	001340
	SIM-SINA OSUNA		001350-
50	CONTAUTOMAG	}	001360
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	$\frac{1}{2} \frac{1}{2} \frac{1}$	-	001380
100	FIDERATURE SCOTE & TO BE SCOTE A SCOTE		001390-
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51	CONTINUE		001410-
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		1	
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Paul Mackenzie

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What was this earth-shaking program?

PROGRAM-LAFTICE (INPUT, OUTPUT)			
COMMON/VAR/8, ISIZE, MDOWN(10), MUP(10), IPOWER(5) APO		00016
COMMON/VAR2/ALAT2(40000)		,	000180
LEVEE2, ALAFLYALAT2			
CUMPLEX ALATI, ALAT2			000200
+ LATTICE=ISIZE*ISIZE*ISIZE*ISIZE*ISIZE	1999 - Trans and a state of a state of the		000220
* INVERSE TEMPERATURE = B			000230
- * SUBROUTINE MONTE(I) GIVES I MONTE CARLO ITERATION	S-PER-LI	NK	000240
*MUP AND MDOWN ARE DIMENSIONED TO ISIZE			000270
DOWNOT RUNWET HAB = 0	aya nagazar wana kanan wa pantan a		
ISIZE=10		· · .	000290
R556			000300
NMAX=ISIZE			000310
MOP(N) = MOD(N, ISIZE) + 1		· · · · ·	000330
DUCNET E	and a start of the start of the start		000340
			000350
ME-ANICITENS			000360
PIC = 4 + 1 5 1 2 E + + 4			000370
			000380
ALAII(17) II			000390
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COMMON/VARIATI (ADDDA)	гудра		000600
COMMON/VAR2/ALAT2/40000)			000510
LEVEL 2. ALATI ALAT2		· · · ·	000620
COMPLEX ALATI ALATZ UINTI UINTZ ANEWI ANEWZ			000030
CUMPLEX A1251, A2651, A6551, A1351, A3451, A4551, A	12651.41	3451	000040
	12652.41	3452	000030
INTEGER X(4)			000000
PRINTA, ITER, HITERATION(S)			
TEMP=1/B			000690
SUM=0	t in	1.104.19	000710
*** \$ \$ } TEmeLOOPS	<u>_</u>		
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5)	· 0.2	IVM I	000730
DU50IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPO#ER(1)			000740
DO50JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2)			000750
D050KS=1, ISIZE3X(3) = KS3MD=MC+KS*IPOwER(3)			000760
D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4)			000770
* SELE Coting INK Contraction and Contraction			000780
DO 50 I1=1,4	Z×	x 6	000790
		· · · · · · · · · · · · · · · · · · ·	
*LUCATE NEXT SITE IN IL DIRECTION	Liz		000810
M45=IPO₩EH(11) *(MUP(X(I1)) -X(I1))	<u>_</u>		0008-20
	1 ×	L15-7×5	000830
P C - H C + L + L C - C + C + C + C + C + C + C + C + C +	*****************	**************************************	
			000850
			000000
LA (ACATE NETRICOTING STRES AND LINKS	3 x	хЦ	000870
M2-M1-TPOWERITELING			000880
			000890
M4-M2+M45			
			000910
1 1 3-N1 1 7 7 65			000920
			000930
			000940

L45=M4+I2IP5 L56=M5+I2IP5 L26=M2+I1IP5		-000950
L56=M5+I2IP5 L26=M2+I1IP5	3	
L26=M2+I1IP5		000960
		-000970
+OBTAIN-INTERACTING-SPINS		000980 ~^^^
A12S1=ALA11(L12)\$A12S2=ALAT2(L12)	1	001000
A3451=ALAT1(L34)\$A2652=ALAT2(L26)		-001010
		001020
A65S1=CONJG(ALAT1(L56))\$46552==41 AT2(L56)		-00-10-30
A1351=CONUG1ALAT111-31-)-\$A1352=-A1-AT211-31-)-		001040
*MULTIPLY INTERACTING SPINS		001060
A12651=A1251=A1252+CONJG(A2652)		-001030
A12652=A1251*A2652+A1252*CONJG(A2651)	ι.	001080
A13452=A1351#A3451=A1352#CONJG(A3452)		-001090
UINTIQUINTIALISE ALISE CONJULASES	14	001100
C -A126S2*CONJG(A65S2)		-001110
C-+A134S1*A45S1	ta i	001120
C -A13452*CONJG(A4552)		0011-30
UINT2=UINT2+A126S1+A65S2		001140 -001150
C +A12652°CONJG(A6551)	}	001160
C = 4A134528C0AUC(AAEC)		-0011-70-
CONTINUE		001180
*SELECT NEW GROUP FLEMENT	·	-001-1-90-
UMAG=SQRT (REAL (UINT) + CON IG (ILTNT) + ILTNT 28 CONLIC (UINT 21)	t) -	001200
UMAGIN=1/UMAG	1	-001210-
BAG=UMAGIN&FEMP	İ	001220
OME2B=1-EXP(-2*B*UMAG)	1	001240
0 AU=1+ALOG(1,-OHE2B*RANF(0))*BAG	· · · · · · · · · · · · · · · · · · ·	001240
RAUELMAURYZ		001260
A3 = SORT(RAH) * (2*PANE(0) - 1)		001270-
8	1	001280
AMAG=A1**2+A2**2	1	-001590-
IF (AMAG.GT. 25) GOT08	ŀ	001300
ANEW1=CMPLX(A0,A3)*UMAGIN	1	001330
ANEW2=CMPLX(A2, A1)+(UMAGIN+SQRT((1A0++2-A3++2)/AMAG))		001320
ALAII(LIS)=ANEWI*UINTI-ANEW2*CONJG(UINT2)	Ì	001340
SUM=SUM+AD8HMAG		00-1-350-
50CONTINUE	Ì	001360
APQ=1SUM/(6.*4.*ISIZE**4)		001370-
PHINT100, ISIZE, B, APQ	1	001380
100 FORMAT(" ISIZE=", I2," GROUP=SU(2)",	1	001390-
		001400 <u> <u> </u></u>
51 CUNTINUE	1	001420
RC1UAA	·,	001430-
		001440
		·····
	1	· · ·
	1	
	1	-
	!	
My notes	<u> </u>	
My notes	1	

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• I found I could understand the whole program just by reading it.

- The lattices were called U,
- the analogs of vector potentials were called A,
- links were L, sites were M.

CANTIATIATIATICI		~ ~~~
SUM=0	\$ 105	1110012
*** * 5 FFE-LWOPS-	Children Charles and Charles	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5)	\cdot \circ \circ	IVM I
	ىنى ئىرىكەتىرىكى بىرى بىرى بىرى بىرى بىرى بىرى بىرى	
D050JS=1, ISIZESX(2) = JSSMC=MB+JS*TPOWER(2)		
		ويور الحالي الإربورية الحالية ومراجعة والإربية والحالية المحالية المحالية المحالية المحارية المحالية
DU50LS=1, ISIZESX(4)=1 SSM1=M0+1 S*TPOWER(4)		
*** SELECT-EINK	The Lands View View of the Carl and a construction of the construc	
0050 I1=1+4	7 -	×h
UINT1=UINT2=0-	fn 5	
*LOCATE NEXT SITE IN II DIRECTION	L12	,
	1	
M5=M1+M45	1 2 -1	15 5 1 6
ILPS=IPSIPOWER(5)		X 5
L15=M1+I1IP5		
-*LOOP-OVER-PLANES-CONTAINING-LINK	م من من الم	·
D01J2=1,3\$I2=MOD(I1+J2-1.4)+1	2	× • • •
-+LOCATE-NF-TGHBOR-ING-SITES-AND-LINKS	> ^ _	X Lf
M2=M1+TPOWER(T2)*(MIP(X(T2))-X(T2))		
Comments of the state of the st	·	· · ·





eral values of β .

square Wilson loops at $\beta = 3$ as a function of lattice size. These loops are taken to lie in a fundamental plane of the lattice and are up to six links on a side. Each measurement is an average over all similar loops in the lattice and the error bars FIG. 4. Wilson loops as a function of β .

strong-coupling result

$$W(\Box) \underset{\beta \to 0}{\sim} \frac{1}{4}\beta,$$

$$W(2 \times 2) \underset{\beta \to 0}{\sim} (\frac{1}{4}\beta)^4,$$
(4.1)

and the weak-coupling limit¹⁰

SU(2) GAUGE THEORY

2313



FIG. 4. Wilson loops as a function of β .

coupling result

 $) \sim_{\beta \to 0} \frac{1}{4}\beta,$

(4.1)

The plaquette:

agrees with PT at low g^2 , short distances,

nonperturbative at high g^2 , long distances.

This was the real QCD that we'd been told to expect!

This was a real revolution.

SU(2) GAUGE THEORY

2313



FIG. 4. Wilson loops as a function of β .

-coupling result

$$) \underset{\beta \to 0}{\sim} \frac{1}{4}\beta,$$

This agreement with PT later became a topic of research for me.

This was the first instance that I had seen in a real calculation.

The plaquette:

agrees with PT at low g^2 , short distances,

nonperturbative at high g^2 , long distances.

This was the real QCD that we'd been told to expect!

This was a real revolution.



FIG. 3. Wilson loops at $\beta = 3$ as a function of lattice size.

Science results: $\sqrt{(K)}/\Lambda$



String tension scales as it should from perturbation theory at small lattice spacing.

FIG. 6. The cutoff squared times the string tension as a function of β . The solid lines are the strong- and weak-coupling limits.

```
8
       * lattice
100
               common/var/b, isize, mdown (4), mup (4), ipower (5), apq
200
               common/vari/alat1(1024
300
                                          16,387
               common/var2/alat2(1024)
400
               complex alati, alat
600
       # lattice=isize##4
700
       # inverse temperature=b
       # subroutine monte(i) gives i monte carlo iterations per link
800
       * mup and mdown are dimensioned to isize
900
1000
       * do not run with b=0.
                isize44
1100
                b=2.0
1200
1300
                nmax=isize
                do 5 n=1, nmax
1400
                mup(n)=mod(n, isize)+1
1500
                mdown(n)=mod(n-2+isize,isize)+1
1700
       5
                do 6 n=1,5
1800
                ipower(n)=isize**(n-1)
1900
       6
                mf=4*isize**4
2000
                do 67 i=1, mf
2100
                alati(i)=1.
2200
                alat2(i)=0.
2300
       67
                call monte(100)
2400
2500
                stop
2600
                end
2700
2800
2900
                subroutine monte(iter)
3000
                common/var/b, isize, mdown (4), mup(4), ipower(5), apo
3100
                common/var1/alat1(1024
3200
3300
                common/var2/alat2(1024)
                complex alat1, alat2-
3400
                complex vint1, vint2, anew1, anew2
3500
                complex a12s1, a26s1, a65s1, a13s1, a34s1, a45s1, a126s1, a134s1
3600
                complex a12s2, a26s2, a65s2, a13s2, a34s2, a45s2, a126s2, a134s2
3700
            Buth integer x(4)
3800
                print*, iter, 'iterations'
3900
                temp=1./b
4000
               -iran=1234
4050
                do 51 nit=1, iter
4100
4200
                sum=0.
4300
        * select site
                ma=-ipower(2)-ipower(3)-ipower(4)-ipower(5)
4400
               do 50 is=1, isize,
4500
                do 50 js=1, isize,
4600
                do 50 ks=1, isize,
4700
4800
                do 50 ls=1, isize
4900
                x(1)=15 + M00
                x(2)=15+moD(16/2,2)
                                         1050 18=0,15
5000
                x (3)=k samoo (21/4,2)
5100
                x(4)=15
5200
                m1=ma+it*198644(1)4/s*ipower(2)+ks*ipower(3)+1s*ipower(4)
5300
        * select link
5400
5500
                do 50 i1=1,4
5600
                vinti=0.
5700
                uint2=0.
5800
        * locate next site in il direction
5900
                m45=ipower(i1)*(mup(x(i1))-x(i1))
6000
                m5=m1+m45
6100
                ilip5=il#igower(5)
```

Once I completely understood the program, I began to experiment with it.

100 common/var/b, isize, mdown (4), mup (4), ipower (5), 200 common/vari/alat1(1024 300 16,387 common/var2/alat2(1024) 400 Once I completely understood complex alati, alat 600 # lattice=isize##4 700 # inverse temperature=b the program, I began to subroutine monte(i) gives i monte carlo iterations er link 800 * mup and mdown are dimensioned to isize 900 * do not run with b=0. 1000 experiment with it. isize4 8 1100 h=2.0 1200 1300 nmarmisize 1400 do 5 n=1, nmax size)+1 mup(n)=mod(n, 1500 mdown(n)=mod 5 1700 8 do 6 n=1,5 1800 ipowar(n)=isi 1900 6 lattice mf=4*isize**4 2000 , mup (4), ipower (5), 2100 do 67 i=1, mf common/var/b, isize, mdown (4) alat1(i)=1. 2200 alat2(i)=0. 2300 67 common/vari/alati(1024) 2400 call monte(1 16,387 2500 stop common/var2/alat2(1024) end 2600 2700 complex alati, alat2 2800 2900 subroutine m 3000 lattice=isize**4 Bth common/var/b 3100 3200 common/var1/ inverse temperature=b 3300 common/var2/ subroutine monte(i) gives i monte carlo iterations complex alat: 3400 complex wint! 3500 mup and mdown are dimensioned to isize complex a12s 3600 complex al2si 3700 Buth integer x(4) 3800 do not run with b=0. 3900 print#, iter, 4000 temp=1./b isize=4 -iran=1234 4050 do 51 nit=1 4100 4200 sum=0. * select site 4300 ma=-ipower(2)-ipower(3)-ipower(4)-ipower(5) 4400 do 50 is=1, isize, 4500 do 50 js=1, isize, Go from 4⁴ to 8⁴ lattice! 4600 do 50 ks=1, isize, 4700 4800 do 50 ls=1, isize x(1)=15 + MOD 4900 x(2)= 15+ moD(16/2,2) 1050 18=0,15 5000 x (3)=2 52MOD (25/4,2) 5100 x(4)=15. 5200 m1=ma+it#198624(184)s*ipower(2)+ks*ipower(3)+1s*ipower(4) 5300 5400 select link 5500 do 50 i1=1,4 vint1=0. 5600 5700 uint2=0. + locate next site in il direction 5800 m45=ipower(i1)*(mup(x(i1))-x(i1)) 5900 m5=m1+m45 6000 6100 ilip5=il#ipower(5)

```
8
       * lattice
100
               common/var/b, isize, mdown (4), mup (4), ipower (5), apq
200
               common/vari/alat1(1024
300
                                          16,387
               common/var2/alat2(1024)
400
               complex alati, alat
600
       # lattice=isize##4
700
       # inverse temperature=b
       # subroutine monte(i) gives i monte carlo iterations per link
800
       * mup and mdown are dimensioned to isize
900
1000
       * do not run with b=0.
                isize44
1100
                b=2.0
1200
1300
                nmax=isize
                do 5 n=1, nmax
1400
                mup(n)=mod(n, isize)+1
1500
                mdown(n)=mod(n-2+isize,isize)+1
1700
       5
                do 6 n=1,5
1800
                ipower(n)=isize**(n-1)
1900
       6
                mf=4*isize**4
2000
                do 67 i=1, mf
2100
                alati(i)=1.
2200
                alat2(i)=0.
2300
       67
                call monte(100)
2400
2500
                stop
2600
                end
2700
2800
2900
                subroutine monte(iter)
3000
                common/var/b, isize, mdown (4), mup(4), ipower(5), apo
3100
                common/var1/alat1(1024
3200
3300
                common/var2/alat2(1024)
                complex alat1, alat2-
3400
                complex vint1, vint2, anew1, anew2
3500
                complex a12s1, a26s1, a65s1, a13s1, a34s1, a45s1, a126s1, a134s1
3600
                complex a12s2, a26s2, a65s2, a13s2, a34s2, a45s2, a126s2, a134s2
3700
            Buth integer x(4)
3800
                print*, iter, 'iterations'
3900
                temp=1./b
4000
               -iran=1234
4050
                do 51 nit=1, iter
4100
4200
                sum=0.
4300
        * select site
                ma=-ipower(2)-ipower(3)-ipower(4)-ipower(5)
4400
               do 50 is=1, isize,
4500
                do 50 js=1, isize,
4600
                do 50 ks=1, isize,
4700
4800
                do 50 ls=1, isize
4900
                x(1)=15 + M00
                x(2)=15+moD(16/2,2)
                                         1050 18=0,15
5000
                x (3)=k samoo (21/4,2)
5100
                x(4)=15
5200
                m1=ma+it*198644(1)4/s*ipower(2)+ks*ipower(3)+1s*ipower(4)
5300
        * select link
5400
5500
                do 50 i1=1,4
5600
                vinti=0.
5700
                uint2=0.
5800
        * locate next site in il direction
5900
                m45=ipower(i1)*(mup(x(i1))-x(i1))
6000
                m5=m1+m45
6100
                ilip5=il#igower(5)
```

Once I completely understood the program, I began to experiment with it.



		NULS PROTON DOLED ON N OPENIZIS
00100	+ LATT	ICE SU(2) PROGRAM BASED UN ACCEDED (3) TERMER(5) APP
00200		COMMON/VAR/E: ISIZE: MDOUN(S) MOP (S) TPOMEN(S) THE
00300		COMMON/VAR1/ALAT1(16384)
00400		-COMMON/VAR2/ALAT2(16384)
00500		COMPLEX ALATIALATE-
00600	+ LOTTI	CEFISIZE**4
00700	+ INVER	CE TEMPERATURES
00000		NITTNE MONTE(I) GIVES I MONTE CARLD ITERATIONS PER LINK
00000	+ NUD O	THE PROPERTY AND THE STREET TO ISIZE
00900	+ NUP H	
01000	+ DO NO	IT HON WITH B-0.
01100		ISIZE=3
01200		b=2.0
01300		NHAX=ISIZE
01400		DD 5 N=1+NMAX
01500		MUP(N)=MOD(N+ISIZE)+1
01600	5	MDDHN(N)=MDD(N-2+ISIZE,ISIZE)+1
01700		DD 6 N=1+5
01800	6	IPONER(N)=ISIZE**(N-1)
01900		MF=4+ISIZE++4
02000		DD 67 I=1:MF
02100		ALATI(I)=1+
02200	67	ALAT\$(I)=\$.
02300		CALL MONTE (10)
02400		STOP
02500		END
02600		
02700		
02800		
0.2900		SUBBOLITINE MONTE (ITER)
03000		COMMON/VAR/E.ISIZE.MDOLN(8).MUP(8).TEQUER(5).APD
03100		CONHINA/ARTATE/TEMS TRAN
03200		Thread y(4)
03300		POTATA, TTO, 'TTODATTONS'
03400		TENDEL /D
03500		TRANE1234
03600		nn 51 wittel.itten
03700		CIMED.
03800	+ SELE	T SITE
03900		MAR-IPDHER(2)-IPDHER(3)-IPDHER(4)-IPDHER(5)
04000		DD 50 IS=1.ISIZE.4
04100		pg 50 Js=1.1517E.4
04200		PD 50 KS=1.1517E.4
04300		DD 50 LS=1.ISIZE.4
04350		pp 50 rc=0.15
04400		PD 50 1880.15
04500		x(1)=15+M0D(10,2)+M0D(10,2)+2
04600		x(2)=tst+mp(ts(2,2)+mp(ts(2,2)+2)
04700		x (3) = x = thing (1 = 2 + 2 + thing (1 = 2 + 2) + 2
04800		x(4) =: study (15 (2, 2) tudy (12 (4, 2) *)
04900		Nimet
05000	-	(1) eremuse(1) er(2) erem
05100	+	
05200	and the fact the fit	ng 50 11=1-4
05300		
05400	50	CHEL LINKOPDATE(X,II,HI,SUH)
05500	50	CONTINCE
05600		HTU-1SUM (0++FISIZE++4)
05200	-	PRINTIOU, ISIZE, B, APD
05900	100	HRITE COTION ISIZE, BAND
05900	100	PURHATC ISIZER', 12, ORDUR=SU(2) DE', EA. 4.
06000	51 C	AU.PD.=' (F6.4)
06100		CONTINUE
06200		RETURN
06210		END
06220		
ADEED		

600	
£30	
300	SUEROUTINE LINKUPDATE (X; 11; M1; SUM/
400	COMMON/VAR/B: ISIZE: MDOWN (8); MUP (8); IPONER (3); APR
500	COMMON/VAR1/ALAT1 (16384)
600	(16984)
600	
650	COMMON/UPDATE/TEMP\$ IMAN
5700	COMPLEX ALATI ALATZ
5800	COMPLEX UINT1; UINT2; ANEH1; ANEH2
5900	COMPLEX A12s1, A26s1, A65s1, A13s1, A34s1, A45s1, A12s1, A12s1, A12s1
7800	COMPLEX A1252, A2652, A6552, A1352, A3452, A4552, A12652, A13452
71.00	INTEGER X(4)
7200	1111110
7200	
7300	UNICOT I DESCRIPTION
7480	+ LOCATE NEXT SITE IN II DIRECTION
7500	M45=IPDWER(II) + (MUP(X(II)) - X(II))
7600	M5=M1+M45
7700	IIIPS=II+IPOWER(S)
7800	L15=H1+111P5
17900	+ LODP OVER PLANES CONTAINING LINK
12000	pg 1 J2=1.3
09100	*2=MOD(11+r2=1+4)+1
00100	IC-PUDITING SITES OND LINKS
08200	*LOCATE NEIGHBURING SITES (HUR ((12))-V(12))
08300	$M_{2} = M_{1} + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +$
08400	H3=H1+IPDNER(I2)+(HDGNN(X(IE))-((IC))
03500	M4=M3+M+D
08600	ISIN2=IS+INDHEB(2)
03700	L12=H1+121P5
08800	L31=M3+121P5
08900	L34=M3+111P5
09000	L45=M4+121#5
09100	L56=H5+121P5
09200	L26=H2+11F5
09300	+ DETAIN INTERACTING SPINS
09400	a12=1=aLet1(L12)
09500	e26=1=eren1(1,25)
09600	a34 time at1 (134)
09700	e45s1secent((45)
09200	a65c1=consc(a) a1((56))
09000	
10000	
10000	PIESC-PERTENER
10100	ACOSCHEMIC (LCO)
10200	18-93C=RLRTC(L34)
10300	14052=1LAT2(L40)
10400	AD3524 (ALATE (L307)
10500	LINESCO (MENTE (LSI))
10500	· MULTIPLY INTERACTING SPINS
10700	A10051-A1051+A0051(A1052+C0NJG(A2652)
10800	Aldeschaldsl*Acbsd*Al2s2*CONIG(AC6s1)
10900	A13451=A1351+A3451(A1352+CDNJG(A3452)
11000	-A134s2=A13s1*A34s2*A13s2*c0HJ3(A34s1)
11100	UINT1=UINT1+A126s1+A65s1/A126s2+CDNJG(A65s2)
11200	c +a134s1*a45s1=a134s2*conjg(a45s2)
11300	UINT2=UINT2+A126s1+A65s2+A126s2+CDNJG(A65s1)
11400	(c +A134s1+A45s2+A134s2+CONJG(A45s1)
11500	1 CONTINUE
11600	+SELECT NEH GROUP ELEMENT
11700	UMAG=SERT (REAC (UINT]+CONIC (UINT)) +UINT2+CONICE (UINT2)>>> ABS(UINT3)
11800	UMAGIN=1./UMAG
11900	DAGTUHAGINTEMP
15000	DHE21=1EXP(-2+3+UHAS)
12100	6 A0=1. +ALDG(1DHE2E+RAN(IRAN))+TAS
12200	Rap=1,-a0++2
12300	IF (RAN (IRAN) ++2. GT. RAD) 60 TO 6
12400	A3=SDRT (RAD) + (2+RAN (IRAN) -1.)
CALL OF STREET, ST.	

/		630
00100	+ LATTICE SU(2) PROGRAM BASED ON M. CREUIZ'S	200 SUPPORTED I TANGEDOTE (X 11 + M1 + SUH)
00200	COMMON/VAR/E: ISIZE: MODUN (8) : MUE (8) : IPOMER (3) : APO	SOO SOEROUTINE LINKOPERIN (8) . HUP (8) . IPCHER (5) . APR
00300	COMMON/VARI/ALATI(16334)	400 COMMON/VAR/ 5/15/2010
00400	-CDMMDN/VAR2/ALAT2(16384)	SUU COMMON/VARI/ALATI(16304)
00500	COMPLEX ALATING AT2	600 TOMMEN-AVARCAALATE (18354)
00600	+ LATTICEFISIZE++4	
00700	+ INVERSE TEMPERATURE	DOM DOCED ON M CREHIZ'S
00800	+ SUBROUTINE MONTE(I) + LATTICE SU(2) FRUG	RHM BHSED WIT HECKECTE
00900	+ NUP AND MDOWN ARE DI	(S) + NUP (S) + TPD HER (S) + APD
01000	+ DO NOT RUN HITH D=0. COMMON/VAR/D:	ISIZE, MDOWN (OF MORE CONTINUED OF THE
01100	ISIZE=8	
01200	x=2.0 COMMON/VAR1/A	LAT1(16384)
01300	NMAX=ISIZE	
01400	DO 5 NELINHAX	LAT2(16384)
01500		
01600	5 MDCHN (N) =MCD ()	
01700	DO 6 N=1,5	ACCHIE-
01800	6 IPONER (N) =ISII	
01900	MF=4+ISIZE+++1 + LATTICE=ISIZE**+	
02000	DD 67 1=1+MF	
02100	ALATIONAL + INVERSE TEMPERATURE	-B
002200	67 ALAT⊉(I)=₽.	TTERATIONS RER LINK
05300	CALL MONTE (10) + SUBROUTINE MONTE (1)	GIVES I MONTE CHACE THEAT
02400	STOP	
02500	END NHIP NO CONCERNING	
02600	INOTE DIAD dear	
02700	toto high dogi	oo or interiootaal probity.
02800		
02900	SUBROUTINE HOL	it not blame to original author
03000	COMMON/VAR/ B: ISIZE: MDOWN (8) : MUP (2)	
03100		
03200	INTEGER X(4)	09200 L26=M2+I1IP5
03300	TENET I I TENETIONS	09300 + DETAIN INTERACTING SPINS
03500	TRANE 1234	09400 Al2s1=ALATI(L12)
03600	DO 51 NITELITES	09500 A251=ALATI(L25)
03700		09600 A3431=ALAT1(L34)
03800	+ SELECT SITE	09700 A+551=FLHT1(L+5)
03900	MAR-IPOHER(2) - IPOHER(3) - IPOHER(4) - IPOHER(5)	
04000	DD 50 IS=1, ISIZE,4	
04100	DD 50 JS=1,ISIZE,4	10000 000000000000000000000000000000000
04200	DD 50 KS=1, ISIZE,4	10200 6342286.672(1.34)
04300	DD 50 LS=1,ISIZE,4	10300 e45s2=eLet2(L45)
04350	DD 50 IC=0,15	10400 e65s2=- (eLet2(L56))
04400	DD 50 ID=0,15	10500 (A13s2=- (ALAT2 (L31))
04500	<(1)=1S+MDD(1D,2)+MDD(1C,2)+2	10600 + MULTIPLY INTERACTING SPINS
04600	<pre>\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$</pre>	10700 A126s1=A12s1+A26s1(A12s2+CONJG(A26s2)
04700	x(3)=KS+MDD(IE/4+2)+MDD(IC/4+2)+2	10800 #126s2=#12s1+#26s2+#12s2*comus(#26s1)
04900	x(4)=LS+MDD(IE/8,2)+MDD(IC/8,2)+2	10900 A134s1=A13s1+A34s1(-A13s2+CONJG(A34s2)
05000		11000 -A13452=A1351+A3452+A1352+CONJO(A3451)
05100	+ SELECT 1 THE (1) +X(2) + IPONER(2) +X(3) + IPONER(3) +X(4) + IPONER(4)	11100 UINTI=UINTI+A12651+A6551-A12652+CONJG (A6552)
05200	no 50 rista	11200 C +AI3451*A4051EAI3452*CONJG(A4552)
05300		11400 (C ++124=1++126=1+A65=2+c0NJG (A65=1)
05400	50 CONTINUE	11500 1 CONTINUE
05500	APDEL = SUM (Gederer and)	11600 *SELECT NEW GROUP ELEMENT
05600	PRINT100.15175.5.000	11700 UMAG=SPRT (REAL (UTAT) + CONTRACTOR (UTAT)
05700	C HRITE(25,100) 15175-8-005	11800 UMAGINEL./UMAG
05800	100 FORMAT(' ISTREAMAN	11900 BAGEUMAGINTTEMP
05900	C / OU BE WINE A) ORDURESU(2) DE'.F6.4.	12000 DME28=1EXP (-2+8+UMAS)
06000	51 CONTINUE	12100 6 A0=1. +ALDS(1DHE2E+RAN(IRAN))+EAS
06100	RETURN	12200 RAD=1A0++2
06200	END	12300 IF (RAN (IRAN) ++2, GT. RAD) 60 TO 6
06210	A THE REAL PROPERTY AND A REAL	12400 A3=SDRT (RAD) + (2+RAN (IRAN) -1.)
06220		A REAL PROPERTY AND
	A DESCRIPTION OF A	

		NULS PROTON DOLED ON N OPENIZIS
00100	+ LATT	ICE SU(2) PROGRAM BASED ON ACCESS(2) TEDUER(5) APP
00200		COMMON/VAR/E: ISIZE: MDOUN(S) MOP (S) TPOMEN(S) THE
00300		COMMON/VAR1/ALAT1(16384)
00400		-COMMON/VAR2/ALAT2(16384)
00500		COMPLEX ALATIALATE-
00600	+ LOTTI	CEFISIZE**4
00700	+ INVER	CE TEMPERATURES
00000		NITTNE MONTE(I) GIVES I MONTE CARLD ITERATIONS PER LINK
00000	+ NUD O	THE PROPERTY AND THE STREET TO ISIZE
00900	+ NUP H	
01000	+ DO NO	IT HON WITH B-0.
01100		ISIZE=3
01200		b=2.0
01300		NHAX=ISIZE
01400		DD 5 N=1+NMAX
01500		MUP(N)=MOD(N+ISIZE)+1
01600	5	MDDHN(N)=MDD(N-2+ISIZE,ISIZE)+1
01700		DD 6 N=1+5
01800	6	IPONER(N)=ISIZE**(N-1)
01900		MF=4+ISIZE++4
02000		DD 67 I=1:MF
02100		ALATI(I)=1+
02200	67	ALAT\$ (I)=\$.
02300		CALL MONTE (10)
02400		STOP
02500		END
02600		
02700		
02800		
0.2900		SUBBOLITINE MONTE (ITER)
03000		COMMON/VAR/E.ISIZE.MDOLN(8).MUP(8).TEQUER(5).APD
03100		CONHINA/ARTATE/TEMS TRAN
03200		Thread y(4)
03300		POTATA, TTO, 'TTODATTONS'
03400		TENDEL /D
03500		TRANE1234
03600		nn 51 wittel.itten
03700		CIMED.
03800	+ SELE	T SITE
03900		MAR-IPDHER(2)-IPDHER(3)-IPDHER(4)-IPDHER(5)
04000		DD 50 IS=1.ISIZE.4
04100		pg 50 Js=1.1517E.4
04200		PD 50 KS=1.1517E.4
04300		DD 50 LS=1.ISIZE.4
04350		pp 50 rc=0.15
04400		PD 50 1880.15
04500		x(1)=15+M0D(10,2)+M0D(10,2)+2
04600		x(2)=tst+mp(ts(2,2)+mp(ts(2,2)+2)
04700		x (3) = x = thing (1 = 2 + 2 + thing (1 = 2 + 2) + 2
04800		x(4) =: study (15 (2, 2) time (1-(4, 2) +2
04900		Nimet
05000	-	(1) eremuse(1) er(2) erem
05100	+	
05200	and the fact the fit	ng 50 11=1-4
05300		
05400	50	CHEL LINKOPDATE(X,II,HI,SUH)
05500	50	CONTINCE
05600		HTU-1SUM (0++FISIZE++4)
05200	-	PRINTIOU, ISIZE, B, APD
05900	100	HRITE COTION ISIZE, BAND
05900	100	PURHATC ISIZER', 12, ORDUR=SU(2) DE', EA. 4.
06000	51 C	AU.PD.=' (F6.4)
06100		CONTINUE
06200		RETURN
06210		END
06220		
ADEED		

600	
£30	
300	SUEROUTINE LINKUPDATE (X; 11; M1; SUM/
400	COMMON/VAR/B: ISIZE: MDOWN (8); MUP (8); IPONER (3); APR
500	COMMON/VAR1/ALAT1 (16384)
600	(16984)
600	
650	COMMON/UPDATE/TEMP\$ IMAN
5700	COMPLEX ALATI ALATZ
5800	COMPLEX UINT1; UINT2; ANEH1; ANEH2
5900	COMPLEX A12s1, A26s1, A65s1, A13s1, A34s1, A45s1, A12s1, A12s1, A12s1
7800	COMPLEX A1252, A2652, A6552, A1352, A3452, A4552, A12652, A13452
71.00	INTEGER X(4)
7200	1111110
7200	
7300	UNICOT I DESCRIPTION
7480	+ LOCATE NEXT SITE IN II DIRECTION
7500	M45=IPDWER(II) + (MUP(X(II)) - X(II))
7600	M5=M1+M45
7700	IIIPS=II+IPOWER(S)
7800	L15=H1+111P5
17900	+ LODP OVER PLANES CONTAINING LINK
12000	pg 1 J2=1.3
09100	*2=MOD(11+r2=1+4)+1
00100	IC-PUDITING SITES OND LINKS
08200	*LOCATE NEIGHBURING SITES (HUD ((12))-V(12))
08300	$M_{\text{C}} = M_{\text{C}} = M_{\text{C}} + M_{\text{C}} $
08400	M3=M1+IPDNER(IZ)+(MDDNN(X(IE))-((IC))
03500	M4=M3+M+D
08600	ISIN2=IS+INDHEB(2)
03700	L12=H1+121P5
08800	L31=M3+121P5
08900	L34=M3+111P5
09000	L45=M4+121#5
09100	L56=H5+121P5
09200	L26=H2+11F5
09300	+ DETAIN INTERACTING SPINS
09400	a12=1=aLet1(L12)
09500	e26=1=eren1(1,25)
09600	a34 time at1 (134)
09700	e45s1secent((45)
09200	a65c1=consc(a) a1((56))
09000	
10000	
10000	PIESC-PERTENER
10100	ACOSCHEMIC (LCO)
10200	18-93C=RLRTC(L34)
10300	14052=1LAT2(L40)
10400	AD3524 (ALATE (L307)
10500	LINESCO (MENTE (LSI))
10500	· MULTIPLY INTERACTING SPINS
10700	A10051-A1051+A0051(A1052+C0NJG(A2652)
10800	Aldeschaldsl*Acbsd*Al2s2*CONIG(AC6s1)
10900	A13451=A1351+A3451(A1352+CDNJG(A3452)
11000	-A134s2=A13s1*A34s2*A13s2*c0HJ3(A34s1)
11100	UINT1=UINT1+A126s1+A65s1/A126s2+CDNJG(A65s2)
11200	c +a134s1*a45s1=a134s2*conjg(a45s2)
11300	UINT2=UINT2+A126s1+A65s2+A126s2+CDNJG(A65s1)
11400	(c +A134s1+A45s2+A134s2+CONJG(A45s1)
11500	1 CONTINUE
11600	+SELECT NEH GROUP ELEMENT
11700	UMAG=SERT (REAC (UINT]+CONIC (UINT)) +UINT2+CONICE (UINT2)>>> ABS(UINT3)
11800	UMAGIN=1./UMAG
11900	DAGTUHAGINTEMP
15000	DHE21=1EXP(-2+3+UHAS)
12100	6 A0=1. +ALDG(1DHE2E+RAN(IRAN))+TAS
12200	RAD=1
12300	IF (RAN (IRAN) ++2. GT. RAD) 60 TO 6
12400	A3=SDRT (RAD) + (2+RAN (IRAN) -1.)
CALL OF STREET, ST.	

00100 CDMMON/VAR/F:ISIZE.MODUN(8).MUP(8):IPDWER(5).APD CDMMON/VAR/F:ISIZE.MODUN(8).MUP(8):IPDWER(5).APD CDMMON/VAR/ALATI(16384) CDMMON/VAR/ALATI(168) C	201.00	+ LOTT	CE SU(2) PROGRAM BASED ON M.CREUTZ'S
00000 CDMMON/VAR1/ALAT1(16334) CDMMON/VAR1/ALAT1(16334) 00300 CDMMEN/VAR1/ALAT2(16334) 00500 CDMMEN/VAR1/ALAT2(16334) 00500 CDMMEN/VAR1/ALAT2(16334) 00500 CDMMEN/VAR1/ALAT2(16334) 00500 CDMMEN/VAR1/ALAT2(16334) 00500 SUBROUTINE MONTE(I) GIVES I MONTE CARLD ITERATIONS PER LINK 00900 MUP AND MODEN ARE DIMENSIONED TO ISIZE 01000 DO NOT RUN HITH B=0. 01100 ISIZE=8 01400 DO S NT RUN HITH B=0. 01100 ISIZE=8 01400 DO S NT RUN HITH B=0. 01500 MUP (N)=MOD (N-ISIZE)+1 01600 S MDDUAN (N)=MOD (N-ISIZE)+1 01600 DO S N=1.5 01800 C IPDAER(N)=ISIZE++(N-1) MF=4+ISIZE++4 02100 MF=4+ISIZE++4 02200 CALL MONTE(10) 02400 STOP 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 02500 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 02500 02500 02500 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 02500 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 02500 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 COMMON/VAR1S:ISIZE.MDDUN(8):MUP(8); IPDAER(5); ARED 02500 INTEGER X(4) COMMON/VAR1S:ISIZE.MDDUN(8); IPDAER(5); ARED 02500 INTEGER X(4) COMMON/VAR1S:ISIZE.MDDUN(8); IPDAE	00100		COMMON/VAR/\$+ISIZE+MDDWN(8)+MUP(8)+IPDWER(5)+APD
00000 CDMMON CARE/ALATE(16894) CDMMLEX ALATELALATE 00500 LATTICE ISIZE+44 00700 SUBROUTINE MONTE(1) GIVES I MONTE CARLD ITERATIONS PER LINK MUP AND HODEN ARE DIMENSIONED TO ISIZE 00100 D DO T RUN WITH B=0. 01100 ISIZE=8 01200 DD 5 N=1.NMAX 01500 NMAX=ISIZE 01400 DD 5 N=1.NMAX 01500 MUP (N)=HOD (N:ISIZE)+1 01700 DD 5 N=1.NMAX 01500 MUP (N)=HOD (N:ISIZE)+1 01700 DD 5 N=1.SIZE+4 02000 DD 6 N=1.5 01800 6 IPOMER (N)=ISIZE++(N-1) MP=4+ISIZE++4 02100 COMMON/VARYELSIZE.ND 02500 END 02500	00200		COMMON/VAR1/ALAT1 (16384)
00400 COMPLEX ALATIALATZ 00500 COMPLEX ALATZA 00500 COMPLEX ALATZA 0	00300		CDMMDN/VAB2/AL AT24163847
00500 • LATTICE=ISIZE++4 00700 • LATTICE=ISIZE++4 00700 • INVERSE TEMPERATURE=B 00900 • SUBROUTINE MONTE(I) GIVES I MONTE CARLO ITERATIONS PER LINK 00900 • MUP AND HODNA ARE DIMENSIONED TO ISIZE 01000 • DO NOT RUN WITH B=0. 01200 B=2.0 01300 NMARE=ISIZE 01400 DO 5 N=1,NMAX 01500 MUP(N)=MOD(N+ISIZE)+1 01600 5 MDOHN(N)=MOD(N-2+ISIZE)ISIZE)+1 01700 DO 6 N=1,5 01800 6 IPONER(N)=ISIZE++(N-1) MF=4+ISIZE++4 02000 DO 67 I=1,MF 02100 -ALATT(T)=1+ 02200 67 ALATT(T)=1+ 02200 67 ALATT(T)=1+ 02200 67 ALATT(T)=1+ 02200 END 02500 END 02500 END 02600 SUEROUTINE MONTE(ITER) 02600 SUEROUTINE MONTE(ITER) 02600 SUEROUTINE MONTE(ITER) 02600 INTEGER X(4) 03000 COMMON/VAR/D:ISIZE,MDOUN(8),MUP(8),IPONER(5),APD 03100 COMMON/VAR/D:ISIZE,MDOUN(8),MUP(8),IPONER(5),APD 03200 INTEGER X(4) 03300 PRINT+.ITER: ITERATIONS' IRAM=1234 03600 DO 51 NIT=1.ITER 03700 SUM=0.	00400		source are or or 1 to are
00500 + INVERSE TEMPERATURE®S 00700 + INVERSE TEMPERATURE®S 00800 + SUBROUTINE MONTE(I) GIVES I MONTE CARLO ITERATIONS PER LINK 00900 + MUP AND HDDIN ARE DIMENSIONED TO ISIZE 01000 + DO NOT RUN WITH D=0. 1500 D SHI,NMAX 01200 D S=2.0 01300 NMAX=ISIZE 01400 D O S N=1,NS 01400 D O S N=1,NS 01500 MUP(N)=MOD(N+ISIZE)+1 01600 S MDDUN(N)=MOD(N-2+ISIZE,ISIZE)+1 01600 D O G N=1,5 01800 6 IPONER(N)=ISIZE++(N-1) MF=4+ISIZE++4 02000 D O G 7 HLNF 02200 67 ALAT\$(I)=\$. 02300 CALL MONTE(ITER) 02400 STOP 02500 END 02500 END 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE,MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02600 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;MDUN(8);MUP(8);IPONER(5);APD 02700 COMMON/VAR/D:ISIZE;IPONE 02700 COMMON/VAR/D:ISIZE;IPONE 02700 COMMON/VAR/D:ISIZE;IPONE 02700 COMMON/VAR/D:	00500		CONFLEX REFEL
00700 * INVERSE TEMPERATORES I MONTE CARLO ITERATIONS PER LINK 00800 * SUBROUTINE MONTE(I) GIVES I MONTE CARLO ITERATIONS PER LINK 00900 * HUP AND HDOWN ARE DIMENSIONED TO ISIZE 01000 * DO NOT RUN WITH B=0. 01100 JSIZE=8 01200 DS ==1, NMAX 01500 MUP(N) =HOD(N, ISIZE) +1 01600 5 MEDUAN(N) =HOD(N-2+ISIZE, ISIZE) +1 01700 DD 6 N=1,5 01800 6 IPDHER(N)=ISIZE+*(N-1) MEDUAN(N) =HOD(N-2+ISIZE, ISIZE) +1 01700 DD 67 I=1, HF 02100 ME=4*ISIZE+*4 02000 DD 67 I=1, HF 02100 CALL HONTE(ID) 02400 STOP 02500 CALL HONTE(10) 02400 STOP 02500 END 02500 END 02500 CDHHON/VAR/D, ISIZE, MDOLN(8), MUP(8), IPDWER(5), APD 03100 CDHHON/VAR/D, ISIZE, IPDWER(5), IPDWER(5), APD 03100 CDHHON/VAR/D, ISIZE, IPDWER(5), IPDWE	00500	+ LHITI	
00800 + FURNEDITINE MONTE(I) GIVES I MARIE GALES 00900 + HUP AND HDDHN ARE DIMENSIONED TO ISIZE 01000 + DD NOT RUN WITH B=0. 01100 ISIZE=8 01200 B=2.0 01300 NHAK=ISIZE 01400 DD 5 N=1.NHAX 01500 MUP(N)=HOD(N-ISIZE)+1 01600 5 HDDHR(N)=HOD(N-2+ISIZE.ISIZE)+1 01700 DD 6 N=1.5 01800 6 IPOWER(N)=ISIZE+*(N-1) 01900 HF=4+ISIZE+*(N-1) 01900 DD 67 I=1.HF 02100 -ALAT2(I)=1. 02200 67 ALAT2(I)=1. 02200 67 ALAT2(I)=1. 02200 END 02500 END 02600 02600 CDHHON/VAR/B.ISIZE.MDDHN(8).HUP(8).IPDHER(5).APD 03100 INTEGER I.F	00700	+ INVER	SE TEMPERATURE ST HOUTE CORLD ITERATIONS PER LINK
00900 * MOP AND HIDLAN ARE DIMENSIONED TO TARK 01000 * DD NOT RUN WITH D=0. 01100 ISIZE=8 01200 D=2.0 01300 NMAX=ISIZE 01400 DD 5 N=1.NMAX MUP (N)=HDD (N+ISIZE)+1 01600 5 MDDHN (N)=HDD (N-2+ISIZE+ISIZE)+1 01700 DD 6 N=1.5 01800 6 IPOWDER (N)=ISIZE+*(N-1) HF=4+ISIZE+*4 02000 DD 67 I=1.HF 02100 ALEAT(1)=4. 02200 CALL HONTE(10) 02400 STOP 02500 END 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03100 CDHHON/UAR/D.ISIZE.MDDHN (8) *HUP (8) *IPDWER (5) *APD 03100 INTEGER *(4) 03100 FRINT*.ITER*.IITER	00300	+ SUBNO	UTINE MONTE(I) GIVES A MONTE TO TELZE
01000 + DD NDT RUN WITH B=0. 01100 ISIZE=8 01200 B=2.0 01300 NMAX=ISIZE 01400 DD 5 N=1,NMAX 01500 MUDP(N)=HDD (N:ISIZE)+1 01600 5 MDDHN(N)=MDD (N-2+ISIZE.ISIZE)+1 01700 DD 6 N=1.5 01800 6 IPDHER(N)=ISIZE++(N-1) 01900 HF=4+ISIZE++4 02000 DD 67 I=1,MF 02100 -ALAT1(T)=1. 02200 67 ALAT2(I)=\$. 02300 CALL MONTE(ID) 02400 STOP 02500 END 02600 02600 02600 02600 02600 CDHMON/VAR/E.ISIZE.MDDHN(8).MUP(8).IPDHER(5).APD 03100 DD INTEGER X(4) 03100 FRINT+.IFER.IPDHER(5).APD 03100 FRINT+.IPH 03100	00900	· NUP A	ND HDOWN ARE DIMENSIONED TO ISTEE
01100 ISIZE=8 01200 B=2.0 01300 NMAX=ISIZE 01400 DD 5 N=1,NMAX 01500 MUP(N)=MDD(N+ISIZE)+1 01600 5 MDDWN(N)=MDD(N-2+ISIZE,ISIZE)+1 01700 DD 6 N=1,5 01800 6 IPDNER(N)=ISIZE++(N-1) 01900 MF=4+ISIZE++4 02000 DD 67 ALAT\$(I)=\$. 02100	01000	+ DO NO	T RUN WITH B=0.
01200 D=2.0 01300 NHAKX=ISIZE D1400 DD 5 N=1.NHAAX NUP(N)=HDD(N:ISIZE)+1 01600 5 HDDHN(N)=HDD(N-2+ISIZE:ISIZE)+1 01700 DD 6 N=1.5 01800 6 IPDHER(N)=ISIZE++(N-1) HF=4+ISIZE++4 02000 DD 67 I=1.HF 02100 -ALATT(I)=1. 02200 67 ALATŽ(I)=Å. 02300 CALL HONTE(10) STOP 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 02800 02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/S:ISIZE:MDDHN(8):MUP(8):IPDHER(5):APD 03100 DD INTESER : IPDHER(5):APD 03100 DD INTESER : IPDHER(5):APD	01100		ISIZE=8
01300 NHAX=ISIZE 01400 DD 5 N=1.NHAX 01500 MUP (N) =MDD (N+ISIZE)+1 01600 5 MDDUN (N) =MDD (N-2+ISIZE, ISIZE)+1 01700 DD 6 N=1.5 01800 6 IPDWER (N) =ISIZE+*(N-1) 01900 MF=4+ISIZE+*(N-1) 01900 DD 67 I=1.HF 02100 ALATT(I)=1. 02200 67 ALATŽ(I)=\$. 02300 CALL MONTE(10) 02400 STOP 02500 END 02500 END 02600 02700 02800 USERCUTINE MONTE(ITER) 03000 CDHMON/VAR/B,ISIZE,MDDWN(8),MUP(8),IPDWER(5),APD 03100 DD INTEGER X(4) 03100 FRINT+,ITER,ITER,ITER	01200		x=2.0
01400 DD 5 N=1,NMAX 01500 MUP (N)=MDD (N:ISIZE)+1 01600 5 01700 DD 6 N=1,5 01800 6 1PDNER(N)=ISIZE+*(N-1) 01900 MF=4+ISIZE+*4 02000 DD 67 I=1,MF 02100 ALAT\$(I)=\$. 02200 67 02100 ALAT\$(I)=\$. 02200 67 02300 CALL MONTE(10) 02400 STDP 02500 END 02600 CDHMON/VAR/E.ISIZE.MDDHN(8).MUP(8).IPDWER(5).APD 02800 CDHMON/VAR/E.ISIZE.MDDHN(8).MUP(8).IPDWER(5).APD 03100 CDHMON/VAR/E.ISIZE.MDDHN(8).MUP(8).IPDWER(5).APD 03200 INTEGER X(4) 03300 PRINT+.ITER.ITER.INS' 03400 TEMP=1./P 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	01300		NHAX#ISIZE
01500 MUP (N) =MDD (N + ISIZE) +1 01600 5 MDDUN (N) =MDD (N - 2 + ISIZE + ISIZE) +1 01700 DD 6 N=1,5 01800 6 IPDNER(N) =ISIZE ++ (N-1) 01900 MP=4 + ISIZE ++ 4 02000 DD 67 I=1, MP 02100 -ALAT\$ (I) =\$ 02200 67 02100 -ALAT\$ (I) =\$ 02200 67 02100 -ALAT\$ (I) =\$ 02200 67 02100 -ALAT\$ (I) =\$ 02200 CALL MONTE(IO) 02500 END 02500 END 02600 SUBROUTINE MONTE(ITER) 02800 SUBROUTINE MONTE(ITER) 03100 CDMMON/VAR/P, ISIZE, MDDUN(\$), MUP (\$), IPDHER (5), APD 03100 CDMMON/VAR/P, ISIZE, MDDUN(\$), MUP (\$), IPDHER (5), APD 03200 INTEGER X(4) 03300 PRINT*, ITER, 'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1, ITER 03700 SUM=0.	01400		DD 5 N=1+NHAX
01600 5 MDDHN(N) =MDD(N-2+ISIZE, ISIZE) +1 01700 DD 6 N=1,5 01800 6 IPDHER(N) =ISIZE++(N-1) 01900 MF=4+ISIZE++4 02000 DD 67 I=1,HF 02100	01500		MUP (N) =MOD (N+ISIZE)+1
01700 DD 6 N=1.5 01800 6 IPDMER(N)=ISIZE++(N-1) 01900 MF=4+ISIZE++4 02000 DD 67 I=1.MF 02100 -ALAT\$(I)=1. 02200 67 ALAT\$(I)=1. 02200 67 ALAT\$(I)=1. 02200 STOP 02500 END 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 02000 SUBROUTINE MONTE(ITER) 03000 CDHMON/VAR/B:ISIZE.MDOWN(8):MUP(8):IPDWER(5):APD 03100 CDHMON/VAR/B:ISIZE.MDOWN(8):MUP(8):IPDWER(5):APD 03100 CDHMON/VPDATE/TEMP:IRAN 03200 INTEGER X(4) 03100 PRINT+:ITER:'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1:ITER 03700 SUM=0.	01600	5	MDDHN(N)=MDD(N-2+ISIZE,ISIZE)+1
01800 6 IPOHER(N) =ISIZE++(N-1) 01900 HF=4+ISIZE++4 02000 DD 67 I=1,HF 02100	01700		DD 6 N=1+5
01900 HF=4+ISIZE++4 02000 DD 67 I=1,HF 02100 -LATI(I)=1. 02200 67 ALATŽ(I)=Å. 02300 CALL MONTE(IO) 02400 STDP 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/E,ISIZE,MDOHN(8),HUP(8),IPDHER(5),APD 03100 INTEGER X(4) 03100 DD INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),IPDHER(1),IPDHER(5),APD 03100 INTEGER(1),IPDHER(1),	01800	6	IPONER(N)=ISIZE**(N-1)
02000 DD 67 I=1;HF 02100	01900		MF=4+ISIZE++4
02100 02200 67 ALAT\$(I)=\$. 02300 02400 STDP 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/B,ISIZE,MDOWN(8),HUP(8),IPOWER(5),APE 03100 COHHON/VAR/E,ISIZE,MDOWN(8),HUP(8),IPOWER(5),APE 03100 FRINT,IER,IIFE 03100 FRINT,IER 03100 FRINT,IER FRI	00050		DD 67 I=1+MF
02200 67 ALAT&(I)=\$. 02300 CALL MONTE(10) 02400 STOP 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 COMMON/VAR/B:ISIZE:MDOWN(8):MUP(8):IPOWER(5):APD 03100 COMMON/VAR/B:ISIZE:MDOWN(8):MUP(8):IPOWER(5):APD 03100 COMMON/VPDATE/TEMP:IRAN 03200 INTEGER x(4) 03300 PRINT*:ITER:ITERATIONS' 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1:ITER 03700 SUM=0.	02100		-ALATI(I)=1.
02300 02400 02500 02500 02600 02700 02800 02900 02900 02900 CDHHON/VAR/B,ISIZE,MDGHN(8),HUP(8),IPDWER(5),APD 03100 CDHHON/VAR/B,ISIZE,MDGHN(8),HUP(8),IPDWER(5),APD 03100 CDHHON/VPDATE/TEMP,IRAN 03200 INTEGER X(4) PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	002200	67	ALAT\$(I)=\$.
02400 STOP 02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/B,ISIZE,MDOWN(8),HUP(8),IPOWER(5),APD 03100 CDHHON/VPDATE/TEMP,IRAN 03200 INTEGER x(4) 03300 PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1,ITER 03700 SUM=0.	05300		CALL MONTE(10)
02500 END 02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/B,ISIZE,MDOWN(8),HUP(8),IPOWER(5),APD 03100 CDHHON/VPDATE/TEMP,IRAN 03200 INTEGER x(4) 03300 PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1,ITER 03700 SUM=0.	02400		STOP
02600 02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 COMMON/VAR/B,ISIZE,MDOWN(8),MUP(8),IPOWER(5),APD 03100 COMMON/UPDATE/TEMP,IRAN 03200 INTEGER x(4) 03300 PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	02500		END
02700 02800 02900 SUBROUTINE MONTE(ITER) 03000 COMMON/VAR/B,ISIZE,MDOWN(8),MUP(8),IPOWER(5),APD 03100 COMMON/UPDATE/TEMP,IRAN 03200 INTEGER x(4) 03300 PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	02600		
02800 02900 SUBROUTINE MONTE(ITER) 03000 COMMON/VAR/B:ISIZE:MDOWN(8):MUP(8):IPOWER(5):APD 03100 COMMON/UPDATE/TEMP:IRAN 03200 INTEGER x(4) 03300 PRINT*:ITER:ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1:ITER 03700 SUM=0.	02700		
02900 SUBROUTINE MONTE(ITER) 03000 CDHHON/VAR/B,ISIZE,MDOWN(8),MUP(8),IPOWER(5),APD 03100 CDHHON/UPDATE/TEMP,IRAN 03200 INTEGER x(4) 03300 PRINT*,ITER,'ITERATIONS' 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	02800		
03000 CDHHON/VAR/B:ISIZE:MDOWN(8):MUP(8):IPOWER(5):APD 03100 CDHHON/UPDATE/TEMP:IRAN 03200 INTEGER x(4) 03300 PRINT*:ITER:ITERATIONS' 03400 TEMP=1./P 03500 IRAN=1234 03600 DD 51 NIT=1:ITER 03700 SUM=0.	02900		SUBROUTINE MONTE (ITER)
03100 COMMON/UPDATE/TEMP,IRAN 03200 INTEGER × (4) 03300 PRINT*,ITER*(ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	03000		COMMON/VAR/E, ISIZE, MDOWN (8) , MUP (8) , IPOWER (5) , APD
03200 INTEGER × (4) 03300 PRINT*, ITER* (ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	03100		COMMON/UPDATE/TEMP; IRAN
03300 PRINT*, ITER, 'ITERATIONS' 03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	03200		INTEGER ×(4)
03400 TEMP=1./B 03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	03300		PRINT+, ITER, 'ITERATIONS'
03500 IRAN=1234 03600 DD 51 NIT=1.ITER 03700 SUM=0.	03400		TEMP=1./P
03600 DD 51 NIT=1.ITER 03700 SUM=0.	03500		IRAN=1234
03700 sum=0.	03600		DO 51 NIT=1,ITER
	03700		sum=0.

If any of you talks to my wife, could you tell her that I have all of those boxes of stuff in the basement from grad school and postdocs stored for scientific purposes, and not because I'm too lazy to sort through them?

230	the bar we we want the second state of the sec
300	SUEROUTINE LINKUPDATE (X; 11, M1, SUM)
400	COMMON/VAR/B, ISIZE, MDOWN (8), MUP (8), IPOHER (3), APR
500	COMMON/VAR1/ALAT1 (16384)
600	COMMON(VAR2/ALAT2 (16384)
650	COMMON/UPDATE/TEMP+IRAN
200	
200	COMPLEX UTNT1: UTNT2: ANEW1: ANEW2
000	converse at 2st, a26st, a65st, a13st, a34st, a45st, a126st, a134st
2000	COMPLEX A1252, a2552, a6552, a1352, a3452, a4552, a12652, a13452
7100	INTEGED V(4)
7200	INTERNAL AND A STATE OF A STATE O
7200	OINT-0.
7300	Division the the the presention
7400	+ LDCATE NEXT SITE IN 11 SHIP(Y(11))-X(11))
7500	N43=IPDNER(II) CODE (ACII)
7600	Central March Contraction
17700	
17800	CID=HITIIPS
07900	+ LODP OVER PLANES CONTRINING LINE
38000	
08100	IZ=MOD(II+JZ=I)+/ I
00280	+LOCATE NEIGHBORING SITES HND LINES
08300	$M_{2} = M_{1} + 1 P P M_{2} + (12) + (12) P (12) + (12) $
08400	M3-MITIPOWER(IC/ CODUMN COCKE/ COCKE/
08500	M4=M3TM93
03500	121P-1271Pumprov
03700	
03800	L31-m3+1c1r5
08900	1.45==44=2+=5
09000	. 52-25127-55
09100	. 92==02+17=5
09200	OFTOTAL INTERACTING SPINS
09400	al2s1sa.art(L12)
09500	e26s1=ex.er1(0.26)
09600	e34z1=eLet1(L34)
09700	e45s1=eLet1(L45)
09800	A65s1=CONSC (ALAT1 (L56))
09900	A13s1=CONJG (ALAT1 (L31))
10000	(12) STALAT2(L12)
10100	A2652=ALAT2(L26)
10200	A3432#ALAT2(L34)
10300	A45s2=ALAT2 (L45)
10400	A65s2=- (ALAT2(L56))
10500	(A13g2=-(ALAT2(L31))
10600	+ MULTIPLY INTERACTING SPINS
10700	A12651=A1251+A2651(A1252+CDNJG(A2652)
10800	#126s2=#12s1+A26s2+B12s2*CIBird(A26s1)
10900	A134s1=A13s1+A34s1-A13s2+CDNJG(A34s2)
11000	-A13452=A1381*A3452*A1882*CEM10(A3451)
11100	UINTI=UINTI+AL2051+AL2052+CDNJG(A6552)
11200	C THISTSITHSITENESSTERISTSCHEDNIG(4552)
11400	OTATE OTATE STATES TANDER CONJE (ASSI)
11500	1 CONTINUE
11600	+SELECT NEW GROUP ELEMENT
11700	UMAGESPET (MEAL OUTNEL CONTRACTOR LAND CONTRACTOR CONTRACTOR
11800	UMAGIN=1. /UMAG
11900	DAG=UMAGIN+TEMP
12000	DHE28=1EXP(-2+8+UHAG)
12100	6 A0=1. +ALDS (1 DHE2E+RAN (IRAN)) +EAS
15500	RAD=1A0++2
12300	IF (RAN (IRAN) ++2. GT. RAD) 60 TO 6
12400	A3=50RT (RAD) + (2+RAN (IRAN) -1.)
	and the second

058 059 061

What made the SU(2) program so useful as a tutorial?



Kernighan and Plauger's *Elements of Programming Style* has much good advice about programming. Mike's program exemplifies many of the simple rules it recommends.

-CUMMON/VAR/ByISIZEyMDOWN(10);MUP(10);IPOWER(5);APQ-

COMPLEX A12S1, A26S1, A65S1, A13S1, A34S1, A45S1, A126S1, A134S1

-COMPLEX-ALATI, ALATZ, UINTI, UINTZ, ANEWI, ANEW2-

MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) -D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1)-D050JS=1, ISIZE\$X(2)=J5\$MC=MB+JS*IPOWER(2)

Ś	PROGRAM-LATTICE(INPUT, OUTPUT)	
	COMMON/VAR/B, ISIZE, MDOWN(10), MUP(10), IPOWER(5), APO	000166
1		
	COMMON/VAR2/ALAT2(40000)	000180
	LEVEL2, ALATYALAT2	0001-90-
;	CUMPLEX ALATI, ALAT2	000300

	000170 000180 000190-	C34=M3+11IP5 L45=M4+12IP5 L56=M5+12IP5	000950 000960 000970 000980
Write clearly	— do	on't be too clever. K&P	001000 001010 001020 001030 001030 001040 001050 001050 001050 001070 001080
1ው)-ም የወቅድዮ የማሳ የወቅ የመቀም የሆኑ		C +A12052*CUNUG(A0551) 	001100 001110 001120 001130 001140 001150 001150 001160 001170 001180 001190 001200
NEW1,ANEW2 34S1,A45S1,A126S1,A134S1 34S2,A45S2,A126S2,A134S2	000610 	$\begin{array}{c} UMAGIN=1/UMAG \\ BAG=UMAGIN*TEMP \\ OME2B=1-EXP(-2*8*UMAG) \\ -6 \\ A0=1*+ALOG(1*-OME2B*RANF(0))*BAG \\ RAD=1*ALOG(1*-OME2B*RANF(0))*BAG \\ RAD=1*ALOG(1*-OME2B*RANF(0))*BAG \\ RAD=1*ALOG(1*-OME2B*RANF(0))*BAG \\ -6 \\ A0=1**2*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z*Z$	001210 001220 001230 001240 001250 001260 001270 001280 001290
+ 10 ALLOW 77 -IPOWER(5) ON 12M 1 POWER(1) POWER(2)	000700- 000710 000720- 000730 000740- 000750	IF (AMAG.GT25) GOT08 ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2≈CMPLX(A2,A1)*(UMAGIN*SQRT((1A0**2-A3**2)/AMAG)) ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UINT2) ALAT2(L15)⇒ANEW1*UINT2+ANEW2*CONJG(UINT1) SUM=SUM+A0*UMAG	001300 001310 001320 001330 001340 001350

16. Be clear

S&W

7

D01J2=1,3\$I2=MOD(I1+J2-1,--+LOCATE-NE-IGHBORING-SITES-AND-L_.... -00000 M2=M1+IPOWER(I2)*(MUP(X(I2))-X(I2)) 000890 ~M3=M1+IPO#ER(12)#(MDOWN(X(12))-X(12)) -000900 M4=M3+M45 000910 -000920-L12=M1+I2IP5 000930 000940-

✤ INVERS AMUP AND -+D0-NOT-

> 15 -B* NM

-+}E ML ME ÐC -IF MF +1+ AL -AE CA

STOPSEND

INTEGER X(4)

00 50 Il=1,4

M5=M1+M45

*LOCATE NEXT SITE IN II DIRECTI

> L15=M1+I1IP5

-*LOOP-OVER-PLANES-CONTAINING-LI

TEMP=1/B -0051NIT=1-,ITER

SUM=0

-*SITE-LUOPS-

*SELECT-L-INK---

SUBROUTINE MONTE (ITER)

COMMON/VAR1/ALAT1(40000) -COMMON/VAR2/ALAT2(40000) LEVEL2, ALATI, ALAT2

PRINTA, ITER, "ITERATION(S)"

-D050KS=1, ISIZE3X(3)=KS3MD DU50LS=1, ISIZESX(4)=LSSM1

COMMON/VAR/8, ISIZE, MDOWN(10), MUP(10), IPOWER COMMON/VAR1/ALAT1(40000)	R(5), APQ 000166 000170	يني مان مانية المناطقية العامين. من مانية المناطقية المنظلة العامين المناطقية المناطقية المناطقية المناطقية المناطقية المناطقية المناطقية المناط	n an ann an Anna an Ann
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INTEGEI ————————————————————————————————————			
INTEGEI 			
INTEGEI PRINT TEMP=1, 0051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5)	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A	0**2-A3**21/AMAG})	
INTEGEI PRINT* TEMP=1, 0051NF SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1+ISI7E5X(1)=TSSMB=MA+IS*TPOWER(1)	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A) 000730 ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000730	0##2-A3##21/AMAG}) NT2)	
INTEGEI PRINT* TEMP=1, 0051NF SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2)	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(000730 000740 000740 000740 SUM=SUM+A0#UMAC	0##2-A3##2}/AMAG}) NT2) YF}	
INTEGEI PRINT* TEMP=1, 0051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1)- 0050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(3)=K\$\$MD	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A) 000730 ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000740 000750 SUM=SUM+A0*UMAG	0##2-A3##2}/AMAG}) NT2) \T}	
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INTEGEI PRINT* TEMP=1, 0051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) 0050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK	Image: Non-Anewschild and anewschild	0**2-A3* *2}/AMAG}) NT2) ¥F 1)	
INTEGEI PRINT* TEMP=1. D051NH SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D0 50 I1=1,4	Image: Non-Anewschild and anewschild anewschistream anewschild anewschild anewschild anewschild anewschild ane	0**2-А3**2}/АМАG}) NT2) YF1) С 2 \//	
INTEGEI PRINT* TEMP=1. D051NH SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1)- D050JS=1,ISIZE\$X(1)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D0 50 I1=1,4 UINT1=UINT2=0	Image: Non-Text of the second secon	^{0##2-A3##21/AMAG})} NT2) ¥F1) S&W	
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INTEGEI PRINT* TEMP=1, 0051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK 00 50 II=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWER(1)*(MUP(X(11))	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000740 000750 BC BC BC	0**2-A3*#21/AMAG)) NT2) YT1) S&W	
INTEGEI PRINT* TEMP=1, 0051NH SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK 00 50 II=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWER(11)*(MUP(X(I1)) M5=M1+M45	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000740 000750 000750 UM=SUM+A0*UMAG	0**2-A3*#21/AMAG)) NT2) YF1) S&W	
INTEGEI PRINT* TEMP=1. D051NH SUM=0 SITE-L00PS MA=-IPOwER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050II=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWER(11)*(MUP(X(I1)) M5=M1+M45 I1IP5=I1*IPOWER(5)	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000740 000750 Becileat	0**2-A3*#21/AMAG)) NT2) YF1) S&W	
INTEGEI PRINT* TEMP=1. D051NH SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050II=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWER(11)*(MUP(X(I1)) M5=M1+M45 I1IP5=I1*IPOWER(5) LIS=M1+I1IP5	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN 000740 000750 Becoletation Beco	0**2-A3*#21/AMAG)) NT2) YF1) S&W	
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INTEGEI PRINT* TEMP=1. D051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050 II=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWEH(11)*(MUP(X(II)) M5=M1+M45 	ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(UIN 000750 SUM=SUM+A0*UMAG	0**2-АЗ*#21/АМАG)) NT2) YF1) S&W	
INTEGEI PRINT* TEMP=1. D051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(1)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D0 50 I1=1,4 UINT:=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWEH(11)*(MUP(X(II)) M5=M1+M45 	ANEw2=CMPLX(A2,A1)*(UMAGIN*SQRT((1AC ALAT1(L15)=ANEw1*UINT1-ANEw2*CONJG(UIN ALAT2(L15)=ANEw1*UINT2+ANEw2*CONJG(UIN 000750 Beclear	о**2-АЗ*#21/АМАG)) NT2) YF1) S&W	
INTEGEI PRINT* TEMP=1. D051NI SUM=0 SITE-LOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1)- D050JS=1,ISIZE\$X(1)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050 II=1,4 UINT:=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWEH(11)*(MUP(X(11)- M45=IPOWEH(11)*(MUP(X(11)- M5=M1+M45 	$\frac{1}{1000720} \xrightarrow{\text{ANEW2=CMPLX}(A2,A1)*(UMAGIN*SQRT((1,-A0))}{ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN)} \xrightarrow{\text{ALAT2}(L15)=ANEW1*UINT2+ANEW2*CONJG(UIN)}{O00750} \text{SUM=SUM+A0*UMAG}$	0**2-A3**21/AMAG)) NT2) YF1) S&W	
INTEGEI PRINT* TEMP=1. D051NI SUM=0 SITE-LOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050 II=1,4 UINT:=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWEH(11)*(MUP(X(11)) M5=M1+M45 II:P5=I1*IPOWER(5) LIS=M1+I1IP5 LOOP-0VER-PLANES-CONTAINING-LI: D01J2=1,3\$I2=M0D(I1+J2-1, LOCATE-NEIGHBORING-SITES-AND-L M2=M1+IPOWER(12)*(MUP(X(12))-X(12)) M3=M1+IPOWER(12)*(MDOWN(X(12))-X(12))	$\frac{1}{000740} = \frac{1000720}{000740} = \frac{1000720}{000740} = \frac{1000740}{000750} = \frac{1000740}{000750} = \frac{1000740}{000750} = \frac{1000740}{000750} = \frac{1000740}{000750} = \frac{1000740}{000750} = \frac{1000740}{000000} = \frac{100000}{00000} = \frac{100000}{0000} = \frac{100000}{0000} = \frac{100000}{00000} = \frac{1000000}{00000} = \frac{10000000}{00000} = \frac{10000000000}{000000} = 1000000000000000000000000000000000000$	0##2-A3##2}/AMAG}) NT2) YT1) S&W	
INTEGEI PRINT* TEMP=1. D051NI SUM=0 SITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT-LINK D050 II=1,4 UINT:=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWEH(11)*(MUP(X(11)) M5=M1+M45 II:P5=I1*IPOWER(5) LIS=M1+I1IP5 LOOP-0VER-PLANES-CONTAINING-LI: D01J2=1,3\$I2=M0D(I1+J2-1, LOCATE-NEIGHBORING-SITES-AND-L M2=M1+IPOWER(12)*(MDOWN(X(12))-X(12)) M4=M3+M45	ANEW2=CMPLX(A2, A1) * (UMAGIN*SQRT((1AC ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(UIN SUM=SUM+A0*UMAG	0##2-A3##2}//AMAG}) NT2) NT1) S&W	
INTEGEI PHINT* TEMP=1, DU51NI SUM=0 SITE-LUOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) DU50IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DU50JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50LS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50LS=1;ISIZE\$X(4)=LS\$M1 SELECT-LINK DU50JS=1;ISIZE\$X(4)=LS\$M1 SELECT-LINK M45=HPOWER(11)*(MUP(X(12))-X(12)) M3=M1+IPOWER(12)*(MUP(X(12))-X(12)) M4=M3+M45 IZIP5=I2*IPOWER(5)	ANEw2=CMPLX(A2,A1)*(UMAGIN*SQRT((1AC ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(UIN 000750 SUM=SUM+A0*UMAG	0##2-A3##2)/AMAG)) NT2) YT1) S&W	
INTEGE: PHINT* TEMP=1. 0051NI SUM=0 SITE-LOOPS MA=-IPOWER(2) - IPOWER(3) - IPOWER(4) - IPOWER(5) D050TS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1 SELECT_LINK 00 50 II=1,4 UINT:=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTI M45=IPOWER(I1)*(MUP(X(I1)) M5=M1+M45 ILIP5=I1*IPOWER(5) LIS=M1+IIIPS LOOP OVER-PLANES_CONTAINING-LH D01J2=1,3\$I2=MOD(I1+J2=1, M2=M1+IPOWER(I2)*(MUP(X(I2))-X(I2)) M3=M1+IPOWER(I2)*(MDOWN(X(I2))-X(I2)) M4=M3+M45 I2IP5=F2*IPOWER(5) L12=M1+I2IP5	ANEw2=CMPLX(A2,A1)*(UMAGIN*SQRT((1A(ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(UIN ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(UIN SUM=SUM+A0*UMAG	0##2-A3##2}//AMAG}) NT2) NT1) S&W	

COMMON/VAR1/ALAT1(40000) COMMON/VAR2/ALAT2(40000)	(5),APQ	000166 000170- 000180			
LEVEL23 ALATE ALAT2	ning a car in the frankling of the second statement of the		L45=M4+121P5		000
					000
INVERSE TEM					000
				<u>_</u>	001
MOP AND MDOW DONDTRHNW					001
ISIZE=1					001
			_		001
	Don't ov	er-con	nment.	NAP	001
MUP (N) =		•••••••			001
MBOWNEN					6001
DOBNEI,					001
MF=4*IS				·=····································	001
					001
ALATI(M 7					
CALL MONTE(30)		000400-	UINT2=UINT2+A12651+A656	2	001
STOPSEND		000560-	C +A12652*CONJG(A6551)		001
		000570	C +A13452*CONJG(A45S1)	о у солотично сулосу 2 лассоновина, также денова у е со су селекто су около селекто селекто селекто у селекто за селекто селекто с -	
SUBROUTINE MONTE(ITER)	· · · · · · · · · · · · · · · · · · ·	000580	-1 CONTINUE		001
CUMMON/VAR/HATSTSTAR MAAWATAT MIDALA.	• 5+ +== + D Ammana	000390	*SELECT NEW GROUP ELEMENT		001
СОМИС				0NUG(UINT2))	001
LEVEL	It ovt	16711	1 FAA 1111	1011	001
COMPL	JE GAL	849		The Annual Constant	
				26	
COMPL				<u> </u>	-001
COMPL COMPLEA ALLOCTACOULTAUDUCTAIDUCTADTOCTADTOCTATOCTATOCTATOCTATOCTATOCTA	HI20527A13452			T06	001
COMPL 	HICOSCHAIJ452	000660	IF (RANF(0) **2.6T.RAD) 60 A3=SQRT(RAD) * (2*RANF(0)	TO6 -1.)	001 001 001 001 001
COMPL COMPLER RIEJETROJJETRIJJETRJHJETRHJJET INTEGER X(4) PHINTA-ITER-HITEPATTONICIU TEMP	HICOSCYA13452	000660-000670	IF (RANF (0) **2*GT.RAD) 60 A3=SQRT (RAD) * (2*RANF (0)	T06	001 001 001 001 001 001
COMPL COMPLER ALLOCTACOULTAODUCTADUCTADUCTADUCTADUCTADUCTADUCTADUCTA		000660-000670		TOG -1.)	001 001 001 001 001 001 001
COMPL COMPLER RILVETREDUCTRUDUCTRUDUCTRUTUCTRUD	needl	ess	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOTOS	TOG -1., S&W	001 001 001 001 001 001 001 001
COMPL COMPLEX ALLOCTACUOLIAUDDEANDOCTADDECTADDCCADDCC	needl	000660- 000670 CSS	IF (RANF(0) **2.GT.RAD) GO A3=SQRT(RAD) * (2*RANF(0) WOIDS ALA(1) L12/ = ANEW1 #UINT1-	TOG -1.) ANEW2*CON.IG(ULINT2)	001 001 001 001 001 001 001 001 001
COMPL COMPL COMPL INTEGER X(4) PRINTS ITER SITEDATION(S) TEMP 0051 SUM= SITE-LOOP MA=- DU50IS=1yISIZESX(1)=ISSMD=MA+IS*IPOWER(1) DU50IS=1yISIZESX(2)=ISSMD=MA+IS*IPOWER(1)	need!	000660- 000670 CCSS	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALA'I (LIS) = ANEW1*UINT1- ALAT2(LIS) = ANEW1*UINT1-	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2)	001 001 001 001 001 001 001 001 001 001
COMPL COMPL COMPL INTEGER X(4) PHINTS.ITER.IITEPATION/SUD TEMP 0051 SUM= SITE-LOOP. MA=- D050IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1;ISIZE\$X(3)=K\$MD=MC+K\$*IPOWER(3)	need	000660- 000670 CCSS 000740- 000750 	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAIIILISJ=ANEWI*UINTI- ALAT2(LIS)=ANEWI*UINTI- SUM=SUM+A0*UMAG	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2)	001 001 001 001 001 001 001 001 001 001
COMPL COMPL COMPLEX ALLOCTACUOLTAUDDETAIDDETAIDSETAIDDETAIDSETAIDDETAID INTEGER X(4) PHINTA.ITER.ULTERATION/CLU TEMP DU51 SUM= SUM= SITE-LOOP MA=- DU50IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DU50JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4)	need	000660- 000670 00070 000740- 000750 000750 000760- 000770	IF (RANF (0) **2.GT.RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALA(1)(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE	TOG -1.) S&W ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4)	001 001
COMPL COMPL COMPLEX ALLOCTACODETADDETADDETADDETADDETADDETADDETADDETA	need	000660- 000670 00070 000740- 000750 000750 000760- 000770 000780-	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALA'IIILIS/=ANEWI*UINTI- ALAT2(LIS)=ANEWI*UINTI- ALAT2(LIS)=ANEWI*UINT2+ SUM=SUM+A0*UMAG -50 CÖNTINUE APQ=1,-SUM/(6.*4.*ISIZE PHINTIOO, ISIZE, B, APQ	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1)	001 001
COMPL COMPL COMPL INTEGER X(4) PRINTA-ITER-HITERATION/SUB TEMP D051 SUM= D050IS=1yISIZESX(1)=ISSMB=MA+IS*IPOWER(1) D050JS=1,ISIZESX(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZESX(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZESX(3)=KS\$MD=MC+KS*IPOWER(3) D050LS=1,ISIZESX(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK D0 50 I1=1,4 UINT1=UINT2=0	needl	000660- 000670 CCSS 000740- 000750 000760- 000770 000780- 000790	IF (RANF(0) **2, GT, RAD) GO A3=SQRT(RAD) * (2*RANF(0) WOOLDS ALAT1(LID)=ANEW1*UINT1- ALAT2(LID)=ANEW1*UINT1- ALAT2(LID)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) GROUP=SU(2)",	001 001
COMPL COMPL: ALLSCHROUSEANDSCHRUSSCHADSCHADSCH INTEGER X(4) PHINTA ITER HITEPATION/CM TEMP OUSI SUM= SITE-LOOP MA=- DU50IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DU50JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50LS=1,ISIZE\$X(2)=LS\$MD=MC+KS*IPOWER(3) DU50LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK OU 50 I1=1,4 UINT1=UINT2=0 .0CATE NEXT SITE IN I1 DIRECTION	nrcoscyar3452	000660- 000670 CCSS 000740- 000750 000750 000770 000780- 000790 000790 000810	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1,-SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2 CONT_:	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) **4) GROUP=SU(2)", Crownersu(2)", Cr	001 001
COMPL COMPL: ALLOCTACUOLIAUDDCARDSCARDSCARDSCARDSCARDSCARDSCARDSCAR	needl viewscrafij452	000660- 000670 000670 000740- 000750 000750 000760- 000770 000780- 000790 000790 000810 -000820-	IF (RANF (0) **2.GT.RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2 CONT_:	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) GROUP=SU(2)", 2	OOL 001
COMPL COMPL: AILSCARCOSE ADDSCARDSCARDSCARDSCARDSCARDSCARDSCARDSC	$\frac{1}{1 \times 15 \rightarrow \times 5}$	000660- 000670 00070 000740- 000750 000750 000750 000770 000780- 000790 000810 000810 000830 000830	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAT2(LIS)=ANEWI*UINTI- ALAT2(LIS)=ANEWI*UINTI- SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINTIOO,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2 CONT_"B="",F6.4y"-AV;P 51 CONTINUE RETURN END	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) "GROUP=SU(2)", 2,F6.4)	001 001
COMPL COMPL: ALLSCAREDITADDETADDETADDETADDETADDETADDETADDETA	$\frac{1}{1 \times \frac{1}{1 \times \frac{1}{2} \times \frac{1}{2}}}$	000660- 000670 00070 000740- 000750 000750 000760- 000770 000780- 000790 000790 000810 000810 000810 000820- 000830 000840- 000850	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS MUOLOS ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2 CONT ::- B=:-,F6.4,:- AV,P 51 CONTINUE RETURN END	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) GROUP=SU(2)", 2,=**,F6.4	001 001
COMPL COMPL ALL SCARESSEARD SCARDSCARD SCARDSCARD SCARDSCARD SCARDSCARD SCARDSCARD SCARD	$\frac{2 \times \times 6}{1 \times - L^{15} \to \times 5}$	000660- 000670 CSSS 000740- 000750 000750 000750 000770 000790 000790 000810 000810 000820- 000830 000850 000860-	IF (RANF (0) **2.6T.RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAT (LIJ) = ANE W1*UINTI- ALAT 2 (LIJ) = ANE W1*UINTI- ALAT 2 (LIJ) = ANE W1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/ (6.*4.*ISIZE PHINTIO, ISIZE, B, APQ 100 FORMAT (" ISIZE=", IZ CONT "B=", F6.4;" AV.P 51 CONTINUE RETURN END	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) **4) 9" GROUP=SU(2)", 2,=",F6.4}	001 001
COMPL COMPL: COMPL: COMPL: COMPL: INTEGER X(4) PHINT: INTEGER X(4) PHINT: INTEGER X(4) PHINT: D0501S: SUM: D0501S: SUM: D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP D0501S: INTE-LOOP D0501S: INTE-LOOP D0501S: INTE-LOOP D0501S: INTE-LOOP MA:=- D0501S: INTE-LOOP MA:=- INTE	$\frac{2 \times \times 6}{1 \times -L^{15} \times 5}$	000660- 000670 000670 000740- 000750 000750 000760- 000770 000780- 000790 000790 000810 000810 000820- 000830 -000840- 000850 -000860- 000870	IF (RANF(0) **2.GT.RAD)GO A3=SQRT(RAD) * (2*RANF(0) WOOLDS ALAT11L157=ANEW1*UINT1- ALAT2(L15) = ANEW1*UINT1- ALAT2(L15) = ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2 CONT_"-B=",F6:4,"-AV.P 51 CONTINUE RETURN END	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) GROUP=SU(2)", 2	001 001
COMPL COMPL: ALL SCRACUSE FADSSCRAT	$\frac{2 \times \times 6}{1 \times - L^{15} \times 5}$	000660- 000670 000670 000740- 000740- 000750 000750 000750 000790 000790 000810 000810 000820- 000830 000830 000830 000840- 000850 000850 000850 000850 000850 000850	IF (RANF (0) **2, GT, RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS WOOLDS ALAT1(LLIJ)=ANEW1*UINTI- ALAT2(L15)=ANEW1*UINTI- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,ByAPQ 100 FURMAT(" ISIZE=",I2 CONT_"B="yF6.4y" AV.P 51 CONTINUE RETURN END	TOG -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) "GROUP=SU(2)", 2*,F6.4)	001 001
COMPL COMPL: COMPL: COMPL: COMPL: INTEGER X(4) PHINT*-ITFR-HITEPATION/SID TEMP D051 SUME: D050IS=1,ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$MD=MC+KS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK D0 50 I1=1,4 UINTI=UINT2=0 OCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(I1)*(MUP(X(I1))-X(I1)) M5=M1+M45 I1IP5=I1*IPOWER(5) L15=M1+I1IP5 OOP-OVER-PLANES-CONTAINING-LINK D01J2=1,3\$I2=MOD(I1*J2-1,4)+1 OCATE-NEIGHBORING-SITES-AND-LINKS M2=M1+IPOWER(I2)*(MUP(X(I2))-X(I2)) M3=M1+IPOWER(I2)*(MDOWN(X(I2))-X(I2))	$\frac{2 \times \times 6}{1 \times -L^{15} \times 5}$	000660- 000670 00070 000740- 000750 000750 000750 000770 000790 000790 000810 000810 000820- 000820- 000830 000820- 000850 000850 000860- 000850 00080- 00080-	IF (RANF(0) **2, GT, RAD) GO A3=SQRT(RAD) * (2*RANF(0) WOOLDS WOOLDS ALAT2(L15)=ANEW1*UINT1- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2 CONT_:	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) GROUP=SU(2)", 2,=**,F6.4)	001 001
COMPL COMPL	$\frac{2 \times \times 6}{1 \times -L^{15} \rightarrow \times 5}$	000660 000670 00070 000740 000750 000750 000750 000770 00070 00070 00070 000810 000810 000820 000810 000820 000830 000850 000850 000860 000850 000860 000870 000800 000890 000910	IF (RANF (0) **2.GT.RAD) GO A3=SQRT (RAD) * (2*RANF (0) WOOLDS ALAT2(L15)=ANEW1*UINTI- ALAT2(L15)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CÖNTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",IZ CONT "B=",F6.4;" AV.P 51 CONTINUE RETURN END	TO6 -1.) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) **4) **4) GROUP=SU(2)", 2;="yF6:4}	001 001
COMPL COMPL	$\frac{2 \times \times 6}{1 \times -L^{15} \to \times 5}$	000660- 000670 000670 000740- 000750 000750 000750 000770 000780- 000790 000810 000810 000820- 000830 000830 000850 000850 000860- 000850 000850 000860- 000850 000800 000890 000900 000910 000920-	IF (RANF(0) **2.GT.RAD)GO A3=SQRT(RAD)*(2*RANF(0) Woolds ALAT2(LIS)=ANEW1*UINTI- ALAT2(LIS)=ANEW1*UINT2+ SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2 CONT_"B=",F6.4," AV.P 51 CONTINUE RETURN END	TOG -1.) S&W ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT2) ANEW2*CONJG(UINT1) **4) P" GROUP=SU(2)", 2	001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 001 0014 0014 0014 0014 0014 0014 0014 0014 0014 0014 0014 0014 0014

PROGRAM-LAFTICE (INPUT-OUTPUT)		
COMMON/VAR/8, ISIZE, MDOWN(10), MUP(10), IPOWER(5), APO	000166	for the second programme and the second
	000170-	
COMMON/VAR2/ALAT2(40000)	000180	2-34=M3+11-1P5
underson we we we want and the second s		L45=M4+I2IP5
CUMPLEX ALAII, ALAI2	000200	
	<u> </u>	
*DO~NOT-RH		
ISIZ		
B=5-	-	
NMAX: Uso wariahla nam	on that	magn comothing
	ies inui	mean something.
MUP (I		0
Man H 1	000000	C = A13452°CUNJG(A4552)
CALL MONTE(30)	000400-	
STOPSEND	000410	C +A12652*CONJG(A6551)
	000550	
	000570	C +A134S2*CONJG(A45S1)
SUBROUTINE MONTE(ITER)	000580	ASEL FOT NEW OBOUR THE THE
CUMMON/VAR/DyISIZE, MDOWNTIOT, MUPTION, IPOWERTST, APO	000090	*SELECT NEW GROUP ELEMENT
COMMON/VAR1/ALAT1(40000)	000610	LIMAGIN-1 / LIMAG
COMMON/VAR2/ALAT2(40000)	000620-	BAG-HMAGIANSTEND
LEVEL2, ALATI, ALAT2	000630	0ME28=1=EXP(=2#8*11MAG)
COMPLEX-ALATI, ALATZ, UINTI, UINTZ, ANEWI, ANEWZ	000640-	-6AU=1+ALOG(1OME2R*PANE/AL)
COMPLEX A1251, A2651, A6551, A1351, A3451, A4551, A12651, A13451	000650	RAD=1-A0++2
UMPEEX-A12527A26527A65527A13527A34527A45527A126527A13452	000660-	IF (RANE (0) ** 2. GT. RAD) GOTO6-
INTEGER X(4)	000670	A3=SQRT(RAD)*(2*RANF(0)-1.)
TEMP 1/8	-089000-	
	000690	AMAG=A1**2+A2**2
SUMED	000700-	IF (AMAG.GT. 25) GOT08
\$517F-10005- \$ 401 ALLOW	000710	ANEW1=CMPLX(A0,A3)*UMAGIN
MA==TPOWER(2)=TPOWER(3)=TPOWER(4)=TPOWER(5) ON 12MT	000720-	ANEW2=CMPLX(A2,A1)+(UMAGIN+S
DU50TS=1+ISIZE\$X(1)=TS\$MB=MA+TS*TPO#FR(1)	000730	ALAIIILID/ ANEWIRUINTI-ANEWZ
0050JS=1, ISIZE\$X(2)=JS\$MC=MB+JS*TPOWER(2)	000740	SUM=SUM+ADBUMAC
	000750	-50
D050LS=1, ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4)	000770	APQ=1SUM/(6.*4.*IST7F**4)
*SELECT LINK	0.00780-	PHINT100, ISIZE, B, APQ
00 50 Il=1,4 ZX X	6 000790	100 FORMAT(" ISIZE=", 12,"
UINT1=HINT2=0	00800-	CONT
PLOCATE NEXT SITE IN II DIRECTION	000810	51 CONTINUE
M45=1PUNER(11) * (MUP(X(11)) = X(11))	-058000	RE-TURN
M = M + M + S = M + S = M + S = M + S = M + S = M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + M + S = M + S = M + M + S = M + M + S = M + S = M + S = M + S = M + S = M + S = M + S = M + S = M +	5 000830	END
	000840-	
81 DOD - OVER-PLANSS CONTAINING LINK	000850	
*LOCATE-NEIGHBORING-SITES AND LINKS	000870	G
M2=M1+IPOWER(I2)*(MUP(X(I2))~X(I2))	000000	
M3=H1+IP0#ER(12)+(MD0#Ntx(-T2)+-x(-T2)-)	000040	
M4-M3+M45	000910	
I2IP5=I2*IP0WER(5)	000010	
I2IP5=I2+IP0WER(5) L12=M1+I2IP5	000930	

	001080
	001100
	001120
$L = A134579CUNJG(\Delta 4552)$	
UINT2=UINT2+A12651*A6552	001140
C +A12652*CONUG(A6551)	
C-++++++++++++++++++++++++++++++++++++	001160
C +A134S2*CONJG(A45S1)	
CONTINUE	001180
SELECT NEW GROUP ELEMENT	
UMAG=SQRT (REAL (UINT) + CON-IG (UITAT) + UINT28CON IC (UITAT2)	001200
UMAGIN=1/UMAG	
BAG=UMAGIN+TENP	001220
OME28=1-EXP(-2*8*UMAG)	
AD=1++ALOG(1-ONE2B*RANE(0))++BAG OMF2D=AMWI(1. E72*2MAG)	001240
RAD=1~A0**2	
IF (RANF(0) ++2.GT.RAD) GOTOG	001260
A3=SQRT(RAD)*(2*RANF(0)-1.)	-001270-
Al=RANF(U) - 55A2=RANF(U) - 55	001280
AMAG=A1**2+A2**2	
IF (AMAG+GT++25) GOT08	001300
ANEW1=CMPLX(A0,A3)*UMAGIN	001310
ANEW2=CMPLX(A2, A1) $(UMAGIN*SQRT((), AD**2-A3**2)(AMAG))$	001320
ALATI (L15) = ANEW1*UINT1-ANEW2*CON.IG (UINT2)	
ALAT2(L15) -ANEW1+UINT2+ANEW2+CONJG(UINT1)	001340
SUM=SUM+A0*UMAG	
CONTINUE	001350
APQ=1SUM/(6.*4.*ISIZE**4)	001370-
PHINT100, ISIZE, B, APQ	001380
0 FORMAT(" ISIZE=", 12," GROUP=SU(2)".	001390
CONT-11B=119F6+4911AV+PQ+=119F6+41	001400
CONTINUE	001410-
RE-TURN	001420
END	001450
	001440
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001040 -001050-001060 -001070-

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Paul Mackenzie

COMMON/VAR1/ALAT1(40000) COMMON/VAR2/ALAT2(40000)	5),APQ		E34=M3+111P5		······
CUMPLEX ALATI, ALAT2	Richards () Sectors Transform, dor "President and a sector states and a sector states a	000190-	L45=M4+121P5 L56=M5+121P5		0
LATTICE=		undern a			0
		<u> </u>			0
JP AND MI					0
0~NOT-RU					0
					0
NMAX: IIco Maria	hla nama	a that	maan comothing	КАР	0
	υιε παπιε	s inui	mean something.		. 0
			U		0
DUGN					0
IPOW					0
Mr = 41					0
ALAT					· · · 0
AEAT2(+)=0		000400-	L −A13452°CUNJG(A4552)		0
CALL MONTE(30)		000410	C +A12652*CONJG(A6551)		·····
910F#END	**************************************	000560		an a	0
		000570	C +A134S2*CONJG(A45S1)		0
SUBROUTINE MONTE (ITER)		000590	*SELECT NEW GROUP ELEMENT		0
COMMONYVARYDYISIZEYMDOWN(10)-MUP(10)-FPOWER(E	5) , APQ			JINT2*CONJGLIIINT211	0
COMMON/VAR2/ALAT2(40000)		000510	UMAGIN=1/UMAG		0
LEVEL2, ALAT1, ALAT2	•	000630	0ME2B=1=FXP(-2*8*UMAG)	STRUCT DIT ON H	0
CUMPLEX-ALATIJALATZJUINTIJUINTZJANEWIJANEW2-		AAA&AA-		OMESE- ANWI (1. ETZXUMAS)	0
	r	4			0
COMPLEX A1252, A2652, A6552, A131	s of o	tho	rovomnloc		0
-COMPLEX-A1252; A2652; A6552; A13; INTEGER X(4) 	s of o	the	er examples		0
COMPLEX-A1252+A2652+A6552+A13: INTEGER X(4) PHINT*,ITER,"ITERATION(5)" TEMP=1/B D051NIT=1+ITER	s of o	the	er examples		0
COMPLEX-A1252+A2652+A6552+A13 INTEGER X(4) PRINT*+ITER+"ITERATION(5)" TEMP=1/B D051NIT=1+ITER SUM=0	S Of O	the			0 0 0
COMPLEX-A12S2; A2652; A6552; A135 INTEGER X(4) PHINT*, ITER; "ITERATION(5)" TEMP=1/B D051NIT=1; ITER SUM=0 TE-LOOPS	S Of O \$ MALLOWFY	000710 000720-	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*UMAGIN*SQRT((1	-A0**2-A3**2}/AMAG)	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PRINT*,ITER,"ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1+IST7E5X(1)=155MB=MA+ISSTPOWER(1)	S Of O * MA ALLOW AND * MA A	000710 000720- 000730	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(-A0**2-A3**2}/AMAG)) UINT2)	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*,ITER,"ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1yISIZESX(1)=ISSMB=MA+IS*IPOWER(1) D050JS=1,ISIZESX(2)=JS\$MC=MB+JS*IPOWER(2)	S Of O * PAT ALLOWARD ON IPM 1	000710 000720- 000730 000740- 000750	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT2(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG	-A0**2-A3**2}/AMAG}) UINT2) UINT2)	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*, ITER, "ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1+ISIZESX(1)=ISSMB=MA+IS*IPOWER(1) D050JS=1+ISIZESX(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1+ISIZESX(3)=KS\$MD=MC+KS*IPOWER(3)	S Of O + NOT ALLOW FO ON IPM 1	000710 000720- 000730 000740- 000750 000760-	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG -50 CONTINUE	-A0**2-A3**2}/AMAG)) UINT2) UINT1)	
COMPEEX-Al2S2;A2652;A6552;A135 INTEGER X(4) PRINT*;ITER;"ITERATION(5)" TEMP=1/B D051NIT=1;ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) FCT-LINK	S Of O \$ MALLOW FO ALLOW	000710 000720- 000730 000740- 000750 000760- 000770	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1- ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4)	-A0**2-A3**2}/AMAG}) UINT2) UINT2)	
COMPEEX-Al2S2;A26S2;A65S2;A13S INTEGER X(4) PRINT*;ITER;"ITERATION(S)" TEMP=1/B D051NIT=1;ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT-LINK D0 50 II=1;4	S Of O \$ PAT ALLOWAY OP IPM 1 	000710 000720- 000730 000740- 000750 000760- 000770 000780-	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1. ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B;APQ 100 EVEMAT(" ISIZE="1.12."	-A0**2-A3**2}/AMAG}) UINT2) UINT1)	
COMPLEX-A12S2;A26S2;A65S2;A13S INTEGER X(4) PRINT*;ITER;"ITERATION(5)" TEMP=1/B DU51NIT=1;ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) DU50IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT-LINK D0 50 I1=1;4 UINT1=UINT2=0	S Of O * MAI MIONARY ON 112M 1 2 x x 6	000710 000720- 000730 000740- 000750 000760- 000770 000780- 000790 000790	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2," GROUP= CONT-"-B=",F6.4y"-AV*PQ.="*F6.4}	-A0**2-A3**2)/AMAG)) UINT2) UINT1) UINT1)	
COMPEEX-Al2S2, A2652, A6552, A135 INTEGER X(4) PRINT*, ITER, "ITERATION(5)" TEMP=1/B D051NIT=1, ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1, ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1, ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1, ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1, ISIZE\$X(4)=LS\$M1=M0+LS*IPOWER(3) D050LS=1, ISIZE\$X(4)=LS\$M1=M0+LS*IPOWER(4) LECT-LINK D0 50 II=1,4 UINT]=UINT2=0 CATE NEXT SITE IN II DIRECTION M4=-TROWER(4) > (UIB(2)(1)) > (UID)	2 x x 6	000710 000720- 000730 000740- 000750 000760- 000770 000780- 000790 000810	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*UMAGIN*SQRT((1- ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PKINT100,ISIZE,ByAPQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT_"B=";F6;4;"-AV;P0;=";F6;4} 51 CONTINUE	-A0**2-A3**2}/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2; A26S2; A65S2; A13S INTEGER X(4) PRINT*; ITER; "ITERATION(S)" TEMP=1/B OUSINIT=1; ITER SUM=0 TE-LOOPS MA=-IPOWER(2) - IPOWER(3) - IPOWER(4) - IPOWER(5) DUSOIS=1; ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DUSOJS=1; ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DUSOLS=1; ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DUSOLS=1; ISIZE\$X(2)=LS\$MD=MC+KS*IPOWER(3) DUSOLS=1; ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT-LINK OU 50 II=1;4 UINT1=UINT2=0 CATE NEXT SITE IN II DIRECTION M45=IPOWEH(11)*(MUP(X(II))-X(II)) M5=M1+M45	2 x x 6	000710 000720- 000730 000740- 000750 000750 000760- 000770 000780- 000790 000810 000820-	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PRINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT_::::::::::::::::::::::::::::::::::::	-A0**2-A3**2}/AMAG}) UINT2) UINT2) UINT1)	
COMPLEX Al2S2 A2652 A6552 A13 INTEGER X(4) PRINT*, ITER, "ITERATION(5)" TEMP=1/B D051NIT=1+ITER SUM=0 TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT_LINK D0 50 II=1,4 UINT1=UINT2=0 CATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(I1))-X(I1)) M5=M1+M45 -IIIP5=I1*IPOWER(5)	2 x x 6 1 x - LIS	000710 000720- 000730 000740- 000750 000750 000750 000780- 000790 000810 000810 000820- 000830 000830	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CÖNTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,ByAPQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB="yf6.4y" AV*PQ.="yf6.4} 51 CONTINUE RETURN END	-A0**2-A3**2)/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX AL252 A2652 A6552 A13 INTEGER X(4) PHINT*, ITER, "ITERATION(5)" TEMP=1/B OUSINIT=1+ITER SUM=0 TE-LOOPS MA=-IPOWER(2) - IPOWER(3) - IPOWER(4) - IPOWER(5) DUSOTS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DUSOJS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DUSOJS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DUSOLS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DUSOLS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT-LINK DU 50 II=1,4 UINT1=UINT2=0 OCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(I1))-X(I1)) M5=M1+M45 II:IP5=II*IPOWER(5) LIS=M1+IIIP5	2 x x 6 Ln2 1 x - L15 - 7 x 5	000710 000720- 000730 000740- 000750 000750 000760- 000770 000780- 000790 000790 000810 000810 000810 000830 000830	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT-"-B=",F6.4;"-AV.PQ.=",F6.4} 51 CONTINUE RETURN END	-A0**2-A3**2)/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*,ITER,"ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 TE-L00PS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050TS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) LECT-LINK D0 50 I1=1,4 UINT1=UINT2=0 CATE NEXT SITE IN I1 DIRECTION M45=IPOWER(1)*(MUP(X(II))-X(II)) M5=M1+M45 -IIIP5=I1*IPOWER(5) LIS=M1+IIIP5 OP-OVER-PLANES-CONTAINING-LINK D01.12=1+3\$L2=MOD(11+12=1+6)+1	2 x x 6 1 x - LIS	000710 000720- 000730 000740- 000750 000760- 000750 000760- 000770 000780- 000790 000800- 000810 000820- 000830 000840- 000850 000860-	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT(() ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB="",F6.4*" AV.PQ.="",F6.4} 51 CONTINUE RETURN END	-A0**2-A3**2}/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*,ITER,"ITERATION(5)" TEMP=1/B D051NIT=1+ITER SUM=0 (TE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1+ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=LS\$MD=MC+KS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) ELECT-LINK D0 50 I1=1+4 UINT1=UINT2=0 DCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(I1))-X(I1)) M5=M1+M45 I1IP5=I1*IPOWER(5) L15=M1+I1IP5 DOP-OVER-PLANES-CONTAINING-LINK D01J2=1,3\$I2=MOD(I1+J2-1,4)+1 DCATE-NEIGHBORING-SITES-AND-LINKS	2 x x 6 2 x x 6 1 x - LI5 - 7 x 5	000710 000720- 000730 000740- 000750 000750 000760- 000770 000780- 000790 000810 000810 000810 000830 000850 000850 000860- 000870	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1- ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)*ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT	-A0**2-A3**2}/AMAG}) UINT2) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*, ITER, "ITERATION(S)" TEMP=1/B O051NIT=1+ITER SUM=0 ITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) ELECT-LINK D0 50 I1=1,4 UINT1=UINT2=0 DCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(I1))-X(I1)) M5=M1+M45 I1IP5=I1*IPOWER(5) L15=M1+I1IP5 DOP-OVER-PLANES-CONTAINING-LINK D01J2=1,3\$I2=MOD(I1+J2-1,4)+1 DCATE-NEIGHBORING-SITES-AND-LINKS M2=M1+IPOWER(12)*(MUP(X(I2))-X(I2))	5 of o <u><u><u>x</u></u> <u>x</u> <u>b</u> <u>1</u> <u>2</u><u>x</u> <u>x</u> <u>b</u> <u>1</u> <u>1</u> <u>x</u> <u>L</u> <u>1</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>x</u> <u>b</u> <u>x</u> <u>x</u> <u>x</u> <u>y</u></u>	000710 000720- 000730 000740- 000750 000750 000750 000780- 000790 000810 000810 000810 000830 000830 000830 000850 000850 000850 000850 000850 000880- 000880- 000880- 000890	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1: ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,ByAPQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB="*f6.4*" 51 CONTINUE RETURN END	-A0**2-A3**2}/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*,ITER,"ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 (TE-E00PS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1+ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1+ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1+ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) ELECT-LINK D0 50 II=1+4 UINT1=UINT2=0 DCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(1)*(MUP(X(I1))-X(I1)) M5=M1+M45 IITP5=II*IPOWER(5) LIS=M1+IIIP5 D0P-0VER-PLANES-CONTAINING-LINK D0IJ2=1,3\$I2=M0D(II+J2-1,4)+1 DCATE-NEIGHBORING-SITES-AND-LINKS M2=M1+IPOWER(12)*(MUP(X(I2))-X(I2)) M3=M1+IPOWER(12)*(MDOWN(X(I2))-X(I2))	Sofofo $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ $\frac{2 \times \times 6}{1}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$ $\frac{1}{2} \times \frac{1}{2}$	000710 000720- 000730 000740- 000750 000750 000760- 000770 000780- 000790 000780- 000790 000800- 000810 000820- 000830 000820- 000830 000840- 000850 000860- 000880- 000890 000900	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1. ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PKINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT_"-B=",F6.4;"-AV.PQ.=",F6.4} 51 CONTINUE RETURN END	-A0**2-A3**2)/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A12S2+A26S2+A65S2+A13S INTEGER X(4) PHINT*,ITER,"ITERATION(S)" TEMP=1/B D051NIT=1+ITER SUM=0 ITE-LOOPS MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) ELECT-LINK D0 50 II=1,4 UINT1=UINT2=0)CATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(I1)*(MUP(X(I1))-X(I1)) M5=M1+M45 I1IP5=II*IPOWER(5) L15=M1+I1IP5)OP-OVER-PLANES-CONTAINING-LINK D01J2=1,3\$I2=M0D(I1+J2-1,4)+1)CATE-NEIGHBORING-SITES-AND-LINKS M2=M1+IPOWER(I2)*(MUP(X(I2))-X(I2)) M3=M1+IPOWER(I2)*(MUP(X(I2))-X(I2)) M4=M3+M45 I2IP5=I2*IPOWEP(5)	Sofo <i>x x b</i> <i>1</i> <i>x x b</i> <i>1</i> <i>x x b</i> <i>x x x x b</i> <i>x x x x b</i> <i>x x x x b</i> <i>x x x x x x x x x x</i>	000710 000720- 000730 000740- 000750 000750 000750 000760- 000770 000780- 000790 000790 000800- 000810 000820- 000830 000830 000850 000860- 000850 000860- 000870 000880- 000890 000910	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1, ALAT1(L15)=ANEW1*UINT1-ANEW2*CONJG(ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJG(SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FURMAT(" ISIZE=",I2," GROUP= CONT "B=",F6.4," AV.P0.=",F6.4} 51 CONTINUE RETURN END	-A0**2-A3**2}/AMAG)) UINT2) UINT1) SU(2)",	
COMPLEX-A1252;A2652;A6552;A13: INTEGER X(4) PHINT*;ITER;"ITERATION(5)" TEMP=1/B D051NIT=1;ITER SUM=0 (TE-LOOPS MA==IPOWER(2)=IPOWER(3)=IPOWER(4)=IPOWER(5) D050TS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) :LECT-LINK D0 50 II=1;4 UINT:=UINT2=0)CATE NEXT SITE IN II DIRECTION M45=IPOWEH(11)*(MUP(X(I1))=X(11)) M5=M1+M45 ILIP5=II*IPOWER(5) LIS=M1+IIP5 M2=M1+IPOWER(12)*(MUP(X(I2))=X(I2)) M3=M1+IPOWER(12)*(MUP(X(I2))=X(I2)) M4=M3+M45 I2IP5=I2*IPOWER(5) LI2=M1+I2IP5	Sofo <u>+ PAT ALLOUND</u> <u>CAN I</u> <u>2 x x 6</u> <u>1</u> <u>1 x - LI5 - 7 x 5</u> <u>3 x x 4</u>	000710 000720- 000730 000740- 000750 000760- 000760- 000770 000780- 000790 000810 000810 000820- 000830 000820- 000830 000850 000850 000860- 000850 000880- 000880- 000890 000900 000910 000920- 000930	ANEW1=CMPLX(A0,A3)*UMAGIN ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1,AALAT1(L15)=ANEW1*UINT1-ANEW2*CONJGC) ALAT2(L15)=ANEW1*UINT2+ANEW2*CONJGC SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT - B=",F6.4+" AV,P0;=",F6.4+" 51 CONTINUE RETURNE END	-A0**2-A3**2}/AMAG)) UINT2) UINT1) SU(2)",	

87) 87)

COMMON/VAR/B, ISIZE, MDOWN(10), MUP(10), IPOWER(5) COMMON/VAR1/ALAT1(40000)	,APQ	000155 000166 000170		a da anti-array da anti-ar Array da anti-array da anti- Array da anti-array da anti-	
COMMON/VAR2/ALAT2(40000)		000180	145-M4+12105		
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7	C=~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		-A13452*CUNJG(A4552)		(
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		000570	C +A134S2*CONJG(A45S1)		(
SUBROUTINE MONTE (ITER)		000590	*SELECT NEW GROUP FLEMENT		(
COMMON/VAR/DyISTZEyMDOWN(10);MUP(10);IPOWER(5)	JAPQ	000600-		INT2*CONJGLILLNT21	i c
		000610			
LEVEL2, ALATI, ALAT2		000630	0ME28=1=FXP(-2*8*11MAG)	RIFURCT DUC ROOM	0
COMPLEX ALATI, ALATZ, UINTI, UINTZ, ANEWI, ANEW2	lan amin'ny sorana ana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sorana amin'ny sora			OMESE - ANINI (1. ETZXUMAS)	0
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TEMP-1/B		лпе		the community of the second	0
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SUM=0	\$ par Allowid	000710	ANEW1=CMPLX(A0.A3)*UMAGTN		Q
ST-FErreluugo Summinimum menening and and a second and a second and a second second second and a second	ON IPMI		ANEW2=CMPLX(A2,A1)*(UMAGIN*SQRT((1.	-A0++2-A3++21/AMAG)	0
$MA_{mm} + PA_{mm} = PA_{mm} + PA_{mm} = PA_{mm} + PA_{$	· · · · ·	000730	ALATI (L15) = ANEW1*UINT1-ANEW2*CONJG	UINT2)	v
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) DU50TS=1yISIZE\$X(1)=TS\$MB=MA+TS*TPOWER(1)	And a state of the	000190		UINT1)	0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2)		000750	SUM=SUM+A0*UMAG		0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) DU50IS=1+ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) DU50JS=1+ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) DU50KS=1+ISIZE\$X(2)=K\$MD=MC+K\$*IPOWER(3) DU50KS=1+ISIZE\$X(4)=K\$MD=MC+K\$*IPOWER(3)		000750	SUM=SUM+A0*UMAG 50-CONTINUE-		0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1;ISIZE\$X(3)=KS\$MD=MC+KS*IPOWER(3) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK		000750 	SUM=SUM+A0*UMAG -50		0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=I\$\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=J\$\$MC=MB+JS*IPOWER(2) D050KS=1;ISIZE\$X(3)=K\$\$MD=MC+K\$*IPOWER(3) D050LS=1;ISIZE\$X(4)=L\$\$M1=MD+L\$*IPOWER(4) SELECT-LINK D0 50 I1=1;4	2 x x6	000750 	SUM=SUM+A0*UMAG -50 CONTINUE APQ=1.~SUM/(6.*4.*ISIZE**4) 	511(2) 11.	0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=I\$\$MB=MA+I\$*IPOWER(1) D050JS=1;ISIZE\$X(2)=J\$\$MC=MB+J\$*IPOWER(2) D050K\$=1;ISIZE\$X(3)=K\$\$MD=MC+K\$*IPOWER(3) D050L\$=1;ISIZE\$X(4)=L\$\$M1=MD+L\$*IPOWER(4) SELECT_LINK D0 50 II=1;4 UINT1=UINT2=0 0CATE ALEXE SITE IN IN DIDEOTION	2× ×6	000750 000760- 000770 000780- 000790 	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT_:	SU(2)",	0 0 0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=I\$\$MB=MA+I\$*IPOWER(1) D050JS=1;ISIZE\$X(2)=J\$\$MC=MB+J\$*IPOWER(2) D050KS=1;ISIZE\$X(3)=K\$\$MD=MC+K\$*IPOWER(3) D050LS=1;ISIZE\$X(4)=L\$\$M1=MD+L\$*IPOWER(4) SELECT_LINK D0 50 I1=1;4 UINT1=UINT2=0 _OCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(1)))	2 x x b	000750 000760- 000770 	SUM=SUM+A0*UMAG -50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) 	SU(2)",	0 0 0 0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=I\$\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=J\$\$MC=MB+JS*IPOWER(2) D050KS=1;ISIZE\$X(3)=K\$\$MD=MC+K\$*IPOWER(3) D050LS=1;ISIZE\$X(4)=L\$\$M1=MD+L\$*IPOWER(4) SELECT-LINK D0 50 I1=1;4 UINT1=UINT2=0 _OCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(1)*(MUP(X(1))) * ***** M5=M1+M45	2 × × 6 12	$ \begin{array}{r} 000750 \\ \hline 000760 \\ 000770 \\ \hline 000780 \\ 000790 \\ \hline 000810 \\ \hline \end{array} $	SUM=SUM+A0*UMAG -50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) 	SU(2)",	0 0 0 0 0 0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=I\$\$MB=MA+I\$*IPOWER(1) D050JS=1;ISIZE\$X(2)=J\$\$MC=MB+J\$*IPOWER(2) D050KS=1;ISIZE\$X(3)=K\$\$MD=MC+K\$*IPOWER(3) D050LS=1;ISIZE\$X(4)=L\$\$M1=MD+L\$*IPOWER(4) SELECT_LINK D0 50 I1=1;4 UINT1=UINT2=0 _OCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(1))) M5=M1+M45 IIP5=I1*IPOWER(5) L	2 x x 6	000750 000760- 000770 000780- 000790 000800- 000810	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PRINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT	SU(2)",	0 0 0 0 0 0 0 0 0
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(3)=K\$MD=MC+K\$*IPOWER(3) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT_LINK D0 50 I1=1;4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(1))) M5=M1+M45 -IIIP5=IPOWER(5)		000750 000760- 000770 000780- 000790 	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT_:	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1yISIZE\$X(3)=K\$MD=MC+K\$*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK D0 50 I1=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(1))) M5=M1+M45 		000750 000760- 000770 000780- 000790 000810	SUM=SUM+A0*UMAG -50 CÖNTINUE APQ=1SUM/(6.*4.*ISIZE**4) 	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1yISIZE\$X(3)=K\$MD=MC+K\$*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT_LINK D0 50 I1=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(I))) M45=IPOWEH(11)*(MUP(X(I))) M5=M1+M45 II:IP5=II*IPOWER(5) LIS=M1+I1IP5 LOOP-UVER-PLANES_CONTAINING D01J2=1,3\$I2=MOD(I1+J2- LOCATE_NEIGHBORING-SITES-ANE	zx x6	000750 000760- 000770 000780- 000790 000810	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB=",F6.4y" AV.PQ.=",F6.4} 51 CONTINUE	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1;ISIZE\$X(3)=KS\$MD=MC+KS*IPOWER(2) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT_LINK D0 50 I1=1;4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWER(11)*(MUP(X(I))) M45=IPOWER(11)*(MUP(X(I))) M45=IPOWER(5)- LIS=M1+I1IPS LOOP-OVER-PLANES-CONTAINING- D01J2=1;3\$I2=MOD(I1+J2- D01J2=1;3\$I2=MOD(I1+J2- M2=M1+IPOWER(I2)*(MUP(X	zx x6	000750 000760- 000770 000780- 000790 000800- 000810	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB=",F6.4y" AV;PQ.=",F6.4} 51 CONTINUE STANDE	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1;ISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1;ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1;ISIZE\$X(3)=KS\$MD=MC+KS*IPOWER(2) D050LS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(3) D050JS=1;ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT_LINK 00 50 II=1;4 UINT1=UINT2=0 LOCATE NEXT SITE IN II DIRECTION M45=IPOWER(1)*(MUP(X(I))) M5=M1+M45 	Z x x b Liz T	000750 000760- 000770 000780- 000790 000810	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONT CONT STORE CONTINUE STORE CONTINUE	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050LS=1,ISIZE\$X(3)=K\$MD=MC+K\$*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT-LINK 00 50 I1=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(1'))) M5=M1+M45 	Zx x6	000750 000760- 000770 000780- 000790 000810 000810	SUM=SUM+A0*UMAG $50 = \frac{C0NTINUE}{APQ=1SUM/(6.*4.*ISIZE**4)}$ PRINT100,ISIZE,B,APQ $100 = FORMAT(" = ISIZE=",I2," = GROUP= CONT_"-B=",F6.4+" = AV,PQ,="yF6.4+" = AV,PQ,="yF6.4+" = SUM/(6.*4,-SUM/(6.*4.*ISIZE**4))$ 51 = C0NT-"-B=",F6.4+" = AV,PQ,="yF6.4+" = SUM/(6.*4,-SUM/(6.*4.*ISIZE**4)) 51 = C0NT-"-B=",F6.4+" = AV,PQ,="yF6.4+" = SUM/(6.*4,-SUM/(6.*4.*ISIZE**4)) 51 = C0NT-"-B=",F6.4+" = AV,PQ,="yF6.4+" = SUM/(6.*4,-SUM/(6.*4,	SU(2)",	
MA=-IPOWER(2)-IPOWER(3)-IPOWER(4)-IPOWER(5) D050IS=1yISIZE\$X(1)=IS\$MB=MA+IS*IPOWER(1) D050JS=1,ISIZE\$X(2)=JS\$MC=MB+JS*IPOWER(2) D050KS=1yISIZE\$X(3)=K\$MD=MC+KS*IPOWER(3) D050LS=1,ISIZE\$X(4)=LS\$M1=MD+LS*IPOWER(4) SELECT_LINK D0 50 I1=1,4 UINT1=UINT2=0 LOCATE NEXT SITE IN I1 DIRECTION M45=IPOWEH(11)*(MUP(X(I))) M45=IPOWEH(11)*(MUP(X(I))) M45=IPOWER(5) LIS=M1+I1IPS -00P-UVER-PLANES-CONTAINING D01J2=1,3\$I2=MOD(I1+J2- .0CATE-NEIGHBORING-SITES-ANE M2=M1+IPOWER(12)*(MUP(X)) M4=M3+M45 I2IP5=I2*IPOWER(5) L12=M1+I2IP5 L12=M1+I2IP5 L12=M1+I2IP5	zx x6	000750 000760- 000770 000780- 000790 000810 tz:	SUM=SUM+A0*UMAG 50 CONTINUE APQ=1SUM/(6.*4.*ISIZE**4) PHINT100,ISIZE,B,APQ 100 FORMAT(" ISIZE=",I2," GROUP= CONTB=",F6.4y" AV.PQ.=",F6.4} 51 CONTINUE STORE CONTINUE	SU(2)",	

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Michael Creutz



Michael John Creutz is an American theoretical physicist at Brookhaven National Laboratory specializing in lattice gauge theory and computational physics. Wikipedia

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Quarks, gluons and lattices



- Another important contribution of Mike's to novice lattice gauge theorists: *Quarks, gluons, and lattices.*
- Like the SU(2) program, a model of brevity and clarity.
- Important as a textbook and a reference book.





Five years ago in Mainz, bought Mike a beer to say thank you.

- Recent research: CUP monograph authors receive 10-15% of list price in royalties.
 - $(10-15\% \times \$54.15 = \$5.41-\$8.12)$
 - Beer: 3 euros x 1.3 = \$3.90
 - Royalty deficit: \$5.41-\$8.12 3.90 = \$1.51-\$4.22.
 - Beer deficit: 1-2.



- 2x(10-15% x \$54.15) = 2x(\$5.41-\$8.12) = \$10.82-\$16.24
- Royalty deficit: 2x(\$5.41-\$8.12) - 3.90 = \$6.92-\$12.34
- Beer deficit: 2-4

Conclusion??? We are all indebted to Mike.

We are all very indebted to Mike.

for his foundational work in the present approach to lattice QCD, and much else.

- (I in more ways than most people.)
- For your discoveries, your teaching, and your inspiration,

Thank you, Mike!