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Solution of simple toy models via thimble regularization of lattice field theory

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The sign problem prevents lattice simulations of many models of physical interest. One proposal for evading such problems is the thimble regularization. I will discuss its application to the ϕ^4 0-dimensional integral, which is a toy model that has been studied for many years as a prototype of complex-valued action and raises several problems within a treatment via complex Langevin; this model can be successfully solved with the thimble approach, though it exhibits a very non trivial structure. I will discuss the details of the thimble structure in this model along with three different algorithms that we have used to get precise numerical results. I will also briefly outline some preliminary results concerning the application of the thimble approach to a Chiral Random Matrix model, which has been recently discussed in the literature and has proved to be problematic for complex Langevin.

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