

$$S_{x_0}^{(2,2)} = \frac{1}{N_c^2} \left\langle \text{Tr}[V(\overrightarrow{x}_T) V^\dagger(\overrightarrow{y}_T)] \text{Tr}[V(\overrightarrow{y}'_T) V^\dagger(\overrightarrow{x}'_T)] \right\rangle_{x_0}$$