Calculation of Boundary Condition in the Migdal-Kadanoff Spin Glass and Size Chaos

Jeff Gertler[1,*] and Jonathan Machta[1,2,†]

[1]*Department of Physics, University of Massachusetts, Amherst, Massachusetts 01003 USA*
[2]*Santa Fe Institute, 1399 Hyde Park Road, Santa Fe, New Mexico 87501, USA*

Abstract here

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Boundary Condition Calculation —

The Migdal-Kadanoff Renormalization Group offers a method of investigating large spin glass systems within realistic computation times. It takes advantage of a hierarchical structure which can be tailored for any dimension. For this paper we use the necklace structure with d=3 (cite Machta 1993). This geometry has be shown to provide results comparable to the euclidean d=3 spin glass (gonna need that citation). The renormalization group is generated by the comparison of partition functions which yields formulas for combining bonds in parallel and series.

$$K' = K_1 + K_2 \tag{1}$$

$$K' = \frac{1}{2}\ln\left(\frac{\cosh(K_1+K_2)}{\cosh(K_1-K_2)}\right) \tag{2}$$

$$K' = \frac{1}{2}\ln\left(\frac{\cosh(K_1+K_2+K_3+K_4+K_5+K_6+K_7+K_8)}{\cosh(K_1+K_2+K_3+K_4-K_5-K_6-K_7-K_8)}\right) \tag{3}$$

$$\begin{aligned} K_{BC} = 3K_1 + (4K_1 : (3K_2 + 4K_2 : (3K_3 \\ +4K_3 : (3K_4 + 4K_4 : (3K_5 + ...))))) \end{aligned} \tag{4}$$

Size Chaos —

$$F(n) = |\tanh(K_n) - \tanh(K_{\inf})| \tag{5}$$

Some stuff here.

* Electronic address: jgertler@physics.umass.edu
† Electronic address: machta@physics.umass.edu

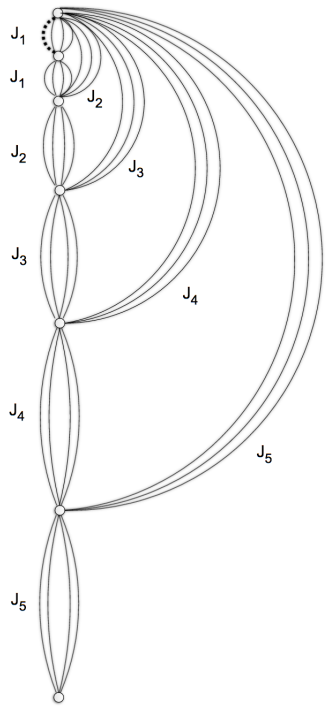

FIG. 1: Full Migdal-Kadanoff latice.

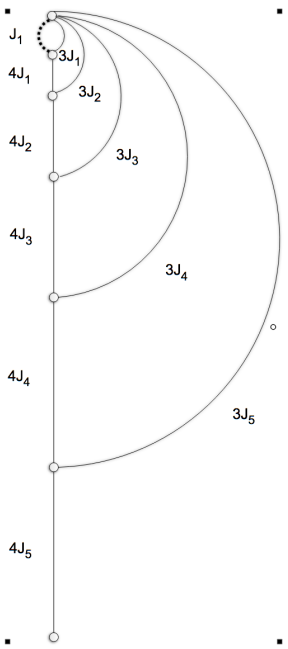

FIG. 2: Reduced Migdal-Kadanoff through parallel equation.