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COMMENT

Comment on 'Monte Carlo test of dimensional reduction for branched polymers in three dimensions'

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Abstract. It is pointed out that the dimensional reduction for tree branched polymers may be derived without the replica trick.

In a recent interesting letter Glaus (1985) studied by numerical simulations the lattice tree model of branched polymers in three dimensions. He finds strong support for the conjecture of Parisi and Sourlas (1981) based on the relation of this model to the Yang-Lee singularity in one dimension. These results also indicate that the relations between these models, by dimensional reduction $d \to d-2$, hold for all $d \geqslant 2$.

In its introduction, which motivates this work, he stresses the necessity to use the replica trick to derive these relations and questions the validity of the approach.

It should be noticed, however, that for the model under consideration there is no necessity to use the replica trick in deriving the dimensional reduction. As shown elsewhere (Shapir 1983, 1985) a generating function for the lattice tree model of branched polymers in any dimension (and any lattice structure) may be expressed in terms of four coupled variables: two bosonic and two fermionic. Near eight dimensions all the operators which differentiate this lattice formulation from the supersymmetric Yang-Lee continuum field theory are explicitly irrelevant. The Monte Carlo results of Glaus (1985) provide more evidence that these operators remain irrelevant in three dimensions as well, which is an important conclusion by itself.

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