Spectral Dimension of a Percolation Network JAYANTA RUDRA,
FOZOH SALIKI, Oklahoma School of Science and Mathematics — While the *fractal dimension d_f* describes the self-similar *static* nature of the lattice, the *spectral dimension d_s* dictates the *dynamic* properties on it. Alexander and Orbach[1] conjectured that the spectral dimension might be exactly 4/3 for percolation networks with embedding *euclidian dimension $d_e \geq 2$*. Recent numerical simulations[2], however, could not decisively prove or disprove this conjecture, although there are other indirect evidences that it is true. We believe that the failure of the simulations to decisively check the validity of the conjecture is due to the non-stochastic nature of the methods. Most of these simulations are Monte Carlo Methods based on a random-walk model and, in spite of very large number of walks on huge lattices, the results do not reach the satisfactory level. In this work we apply a stochastic approach[3] to determine the spectral dimension of percolation network for $d_e \geq 2$ and check the validity of the Alexander-Orbach-conjecture. Due to its stochastic nature this method is numerically superior and more accurate than the conventional Monte Carlo simulations. References: 1. S. Alexander and R. Orbach, J. Phys. Lett. (Paris) 43 (1982) L625. 2. N. Pitsianis, G. Bleris and P. Argyrakis, Phys. Rev. B 39 (1989) 7097. 3. J. Rudra and J. Kozak, Phys. Lett A 151 (1990) 429.

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