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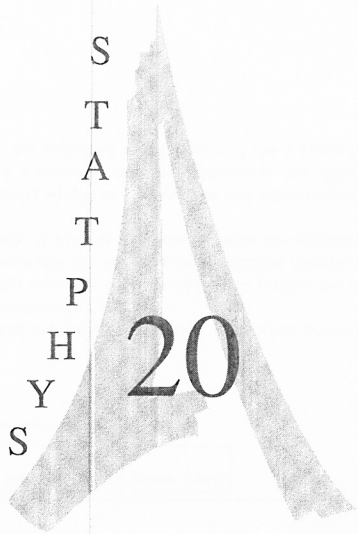

LIVRE DES RÉSUMÉS
BOOK OF ABSTRACTS

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Non-universality in short-time critical dynamics

T1132 : PO01/46

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At the end of last decade, Jassen et al and Huse observed universality in systems out of equilibrium recognizing the existence of a new critical exponent θ which describes the raising of the magnetization at very short time, when small initial magnetization is present in the system. In fact, much time before the system reaches the equilibrium the universal behavior of systems can already be observed. Therefore, the critical phenomena can be studied avoiding the problem of the critical slowing down of Monte Carlo simulations. In this work we address our attention to the behavior of the dynamical exponents of the Ising model when the coupling constant is changed along just one line. Simulations done at early time revealed that the critical exponent θ depends on the strength of the coupling constant (J') of the altered line. On the other hand, our results permit to conclude that the dynamical critical exponent z is not sensitive to changes in J' showing the same results to that of the pure Ising model whatever the value of J'. In adition, we investigate the possible invariance of the anomalous dimension (x_0) of the magnetization at the beginning of the process and, at least withing the precision of our calculation, this hypothesis was confirmed.

A self-organized critical hierarchical model

T0886 : PO01/47

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A model for large-scale evolution recently introduced by Amaral and Meyer is studied analytically and numerically. In this model, species are arranged into food chains. It is found that the model is critical in the thermodynamic limit, with an exponent 2 characterizing the size distribution of extinction events. The lifetime
distribution of species, cutoffs due to finite-size effects, and various other quantities are evaluated. The relevance of this model to biological evolution is critically assessed.

Competing bulk and surface fields in critical Ising films: effects of fluctuations

T0113 : PO01/48

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The two-dimensional Ising model confined in an $L \times \infty$ geometry with bulk H and surface H_1 fields of opposite sign is studied above and close to bulk criticality by the density matrix renormalization group method [1]. This technique, applied recently to $d = 2$ Ising films [2], allows for very accurate results for the adsorption Γ as a function of the reduced deviation from the critical temperature τ [3]. For strong H_1 three distinct classes of shapes of $\Gamma(\tau)$, determined by the value of the parameter $\tau_H \sim (|H|L)^{1/(\Delta-\nu)}$, where L is the width of the film, are found in agreement with earlier predictions [4]. For strong and for weak bulk fields $\Gamma(\tau)$ is a monotonic function, increasing for strong H and decreasing for weak H, in agreement with scaling analysis and earlier mean - field results. For H between these extreme cases $\Gamma(\tau)$ assumes a maximum for $\tau \sim \tau_H$ and for $\tau < \tau_H$ a depletion occurs, as in recent experiments for critical adsorption in porous materials [5]. For a limited range of H a qualitatively new behavior of $\Gamma(\tau)$ is found. In addition to a maximum, a minimum of $\Gamma(\tau)$ for $\tau \sim L^{-1/\nu} < \tau_H$ appears, which in the mean-field analysis was absent.

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Dimensionality and Coordination Number in the Model of Binary Alloy

T0896 : PO01/49

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Impact of dimensionality and co-ordination number on the temperature of the phase transition and the two-point correlation function in binary alloys is analysed. The diamond, simple square, simple cubic and triangle lattices are described. The cluster variation method is used and the hexad, square and triangle are considered as the basic clusters for the diamond, simple square, simple cubic and triangle lattices, respectively.
Dimensionality has the greater effect to the two-point correlation function for the lattices having the same coordination number than to the temperature of the phase transition. Influence of the coordination number on the temperature of the phase transition for the lattices with the same dimensionality is significant for two- and three-dimensional lattices, but impact upon the two-point correlation function is much more in the two-dimensional lattices.

Hermitian matrices coupled in a chain: Eigenvalue correlations and spacing functions

T1028 : PO01/50

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We consider p complex $n \times n$ random hermitian matrices A_1, ..., A_p coupled in an open chain so that the probability density of the matrix elements contains the coupling only of the type $\exp[\mathrm{tr}(\sum_{j=1}^{p-1} c_j A_j A_{j+1})]$.
The probability density of the np eigenvalues is then written as a single $np \times np$ determinant. The correlation functions are the densities of ordered sets of k_j eigenvalues of A_j within small intervals around x_{j1}, ..., x_{jk_j} for $j = 1$, ..., p. Each of these correlation functions is proportional to a determinant obtained by removing the rows and columns corresponding to the ignored eigenalues in the initial $np \times np$ determinant.
The spacing functions are the probabilities of finding exactly k_j eigenvalues of the matrix A_j in the domain I_j for $j = 1$, ..., p. The generating function of these spacing functions is expressed as a Fredholm determinant.
These results generalize those for the one matrix case known for a long time.

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Vapour-Liquid Equilibrium Calculations for Pure Substances from a Cubic Equation of State.

T0903 : PO01/51

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For industrial applications such as supercritical extraction, destilation, separation processes, etc. it is necessary to have accurate equations of state to calculate thermodynamics properties.

In this work we present a cubic on density equation of state (EOS) to predict the vapour-liquid equilibrium of pure Lennard-Jones fluids. The EOS we propose separates the repulsive and attractive contributions of the intermolecular forces following the Weeks-Chandler-Andersen scheme. It permits us to obtain these contributions in coexisting vapour and liquid phases.

The work is extended to determine the relative weight of the repulsive and attractive intermolecular forces on the vapour pressure of 47 non polar substances using LJ´s model as reference. Moreover, the differences between the experimental vapour pressures and the corresponding LJ´s, are expressed as a function of the acentric factor of these substances.

Equilibrium properties of Threshold Accepting

T1264 : PO01/52

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Equilibrium properties of Threshold Accepting
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Threshold Accepting (TA) is used in stochastic optimization as an alternative to Simulated Annealing (SA). SA is a well known physical technique that is used to sample state space properties. As equilibrium probability distribution SA produces the boltzmann distribution. TA, surprisingly enough, for simple problems also results in a boltzmann distribution. For more complex problems however the fact of not having detailed balance seems to result in a drain-effect that increases the probability for lower energies. This effect might explain the better results of TA in stochastic optimization.