solutions of the DMFT (and its extensions mentioned above). Instead, it is based on the factorization of the noninteracting 2-particle density of states (1.24), which is assumed to apply to all momenta except for $\boldsymbol{q} = \mathbf{0}$ and, where appropriate, for $\boldsymbol{q} = \boldsymbol{Q}$. Such a system can in principle be obtained for a given DOS as follows (Gebhard, 1997): for a finite system, one randomly assigns the kinetic energy $\epsilon_{\boldsymbol{k}}$ to each $\boldsymbol{k}$ point in the Brillouin zone where the probability $P(\epsilon)$ of finding the energy $\epsilon_{\boldsymbol{k}}$ in the semi-open interval $[\epsilon - \Delta\epsilon/2, \epsilon + \Delta\epsilon/2[$ is given in terms of the DOS by $P(\epsilon) = \rho(\epsilon)\Delta\epsilon$. In practice, one usually starts with a smooth dispersion and applies a random permutation to the momenta, so that the dispersion is again random, but the DOS of each realization exactly equals the (discretized) target DOS. Since the randomization destroys the topology of the lattice anyway, the method can be formally applied in any dimension; for large enough systems it is claimed to be self-averaging. Due to the neglect of correlations in the noninteracting 2-particle DOS, the RDA makes a large error for processes with small momentum transfer, even in large dimensions (cf. the discussion in subsection 1.2.2) which might affect thermodynamic properties although the associated phase space becomes vanishingly small. Still, it is not apparent how this should be a source of the large discrepancies between RDA estimates for the paramagnetic metal-insulator transition (Noack and Gebhard, 1999) in comparison to all recent DMFT estimates (see chapter 3). Up to now, numerical results for the RDA have suffered from considerable finite-size effects, since the number of $\boldsymbol{k}$ points was restricted to a value of 14 or smaller so far in an exact diagonalization scheme. Reliable evaluation methods for bigger systems are needed for the RDA problem, e.g., an efficient formulation of the density matrix renormalization group (DMRG) method (White, 1992; 1993) in $\boldsymbol{k}$-space, in order to clarify if the different transition scenario is a genuine property of the RDA theory.