



# Equilibrium Fluctuations for Totally Asymmetric Particle Systems

By Patrícia Gonçalves

VDM Verlag Dr. Müller E.K. Okt 2013, 2013. Taschenbuch. Book Condition: Neu. 221x149x15 mm. Neuware - The one-dimensional totally asymmetric simple exclusion process and the totally asymmetric zero-range process are put into context, in order to derive its equilibrium fluctuations. We consider the processes evolving on the hyperbolic time scale and starting from the corresponding invariant states. For both processes taken on the hydrodynamic time scale, the temporal evolution of the limit density fluctuation field is deterministic, in the sense that the limit field at time  $t$  is a translation of the initial one. As a consequence of these results, it is possible to derive Central Limit Theorems for the current of particles and for a tagged particle, and the limit process turns out to be the Brownian motion. By considering these systems in a reference frame moving at the characteristic speed, the limit density fluctuation field does not evolve in time until a longer time scale  $n^{4/3}$ . To prove the later result, a Boltzmann-Gibbs Principle was shown by a multi-scale argument. As a consequence, the current across a characteristic vanishes on this longer time scale. These results should hold until  $n^{3/2}$  and this is a step towards showing the...



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