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DEFORMED SQUEEZED STATE SOLUTION TO THE ASYMMETRIC SIMPLE EXCLUSION PROCESS

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Abstract. Deformed squeezed states are generalized intelligent Schrödinger sates. They are implemented for an exact solution of the stationary n-species stochastic diffusion boundary problem.

1. Introduction

Coherent and squeezed states have a wide range of applications to various problems in many different areas of physics [1–4].

By origin the coherent states are quantum states, but at the same time they are parametrized by points in the phase space of a classical system. This makes them very suitable for the study of systems where one encounters a relationship between classical and quantum descriptions. From this point of view, interacting many-particle systems with stochastic dynamics provide an appropriate playground to enhance the utility of generalized coherent states.

A stochastic process is described in terms of a master equation for the probability distribution $P(s_i, t)$ of a stochastic variable $s_i = 0, 1, 2, ..., n-1$ at a site $i = 1, 2, ..., L$ of a linear chain. A configuration on the lattice at a time t is determined by the set of occupation numbers $s_1, s_2, ..., s_L$ and a transition to another configuration s' during an infinitesimal time step $\mathrm{d}t$ is given by the probability $\Gamma(s, s')\mathrm{d}t$. The time evolution of the stochastic system is governed by the master equation

$$\frac{\mathrm{d}P(s,t)}{\mathrm{d}t} = \sum_{s'} \Gamma(s, s')P(s', t) \tag{1}$$