

## ON THE UNCERTAINTY RELATIONS IN STOCHASTIC MECHANICS\*

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**Abstract.** It is shown that the Bohm equations for the phase  $S$  and squared modulus  $\rho$  of the quantum mechanical wave function can be derived from the classical ensemble equations admitting an additional momentum  $p_s$  of the form proportional to the osmotic velocity in the Nelson stochastic mechanics and using the variational principle with appropriate change of variables. The possibility to treat  $\text{grad}S$  and  $p_s$  as two parts of the momentum of quantum ensemble particles is considered from the view point of uncertainty relations of Robertson - Schrödinger type on the examples of the stochastic image of quantum mechanical canonical coherent and squeezed states.

### 1. Introduction

The uncertainty (indeterminacy) principle in quantum physics, which quantitatively is expressed in the form of uncertainty relations (URs) [13, 14, 24, 25] is commonly regarded as the most radical departure from the classical physics.

However in the recent decades publications have appeared [5, 11, 12, 21, 23] in which inequalities are introduced in Nelson stochastic mechanics (SM) [19] and discussed as Heisenberg-type URs. The equations of motion in this mechanics coincide with the David Bohm equations [1] (the continuity equation and the

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