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Stochastic quantum inflation for a canonical scalar field with a linear self-interaction potential

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Inflation is widely accepted as the standard paradigm of the early Universe. Despite its success, a theory of inflation is still missing. We do not know why the inflation potential is so flat, and it cannot be derived from particle physics in a unique way. The linear potential is very interesting since it is still in agreement with data, and thanks to recent progress it can be derived in the framework of well-established quantum field theory. Starobinsky's formalism of stochastic inflation being applied to the case of a massless minimal coupled scalar field with linear self-interaction potential. We solve the corresponding Fokker-Planck equation exactly and obtain analytical expressions for the stochastic expectation values.

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