On the frequency function for stronger squeezing degree and the exact algebraic solution for the quantum harmonic oscillator with variable frequency

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We obtained an exact algebraic solution for the quantum harmonic oscillator with variable frequency in a closed form. This allows us to implement a numerical calculation to study the dynamics of the system. It is shown that for any frequency function, the instantaneous state of the system is a squeezed one of the initial Hamiltonian. Once the final state is found, is mandatory to analyse the models that maximize the squeezing degree. We present a discussion by comparison the Janszky-Adam scheme, where the frequency modulation accounts through sudden changes between two stable frequencies, and the parametric resonance model, where the frequency modulation accounts through a harmonic function. In such analyses new aspects of the problem are elucidated.

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