Thermal properties and Fisher information for diatomic molecular Hellman-modified-Kratzer potential model

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Abstract

In this paper, we solved the Schrodinger equation with Hellmann-modified Kratzer potential using Nikiforov-Uvarov-Functional Analysis (NUFA) method. The obtained energy is used to study the numerical results of the ro-vibrational energy spectra for some selected diatomic molecules and their thermodynamic properties. In addition, we also investigated the Fisher information for three diatomic molecules and they all satisfied the Stam-Cramer-Rao inequalities uncertainty relations. Special cases of the potential are discussed and we compute the numerical eigenvalue of the modified Kratzer, Kratzer-Feus and Hellmann potentials for comparison with other analytical methods. The results of the present study agree with the results obtained with other known methods.

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