

In this work we join the struggle to find a connection between classical and quantum chaos. We study the classical chaos in the classical limit of a simple algebraic model of molecular vibrations, based on the dynamical symmetry of $u(3)$ algebra. We employ several methods for the classical chaos analysis, namely the Lyapunov exponents, the Poincaré sections, and the chaotic fraction of the classical phase space. It is shown that the chaoticity of the model depends nontrivially both on the strength of the external field and on the energy of the system. This work prepares the ground for a future comparison of classical and quantum chaos indicators.