

In this thesis, the time evolution of Fano model, describing a discrete state embedded in a continuum of states with constant coupling, and generalized version of Fano model for an energy dependent coupling are investigated. For the time evolution of the generalized system, numerical simulation (Gaussian quadrature and numerical integration of a system of differential equations) is used. The system behaves as Fano model predicts when energy-dependent coupling tends to a constant one, and the system exponentially decays into the continuum. For a strongly energy-dependent coupling, the system oscillates between the initial discrete state and the continuum. The thesis provides numerically evaluated time evolution for different parameters of the coupling, brief interpretation of probability oscillation phenomenon and study of the transition between oscillatory and non-oscillatory mode.