

Abstract

Analytic description of radio-frequency (RF) pulses involving quadrupolar spins ($I > 1/2$) in NMR spectroscopy is fraught with difficulty due to large quadrupolar couplings. In this thesis, a modest attempt is made to present an analytic description of pulse experiments involving quadrupolar spins. Specifically, the spin dynamics during selective and non-selective excitation is described using effective RF Hamiltonians. The formalism presented provides a framework for deriving the optimum flip-angles required for selective and non-selective excitations and is in excellent agreement with numerical simulations.