Redfield equations
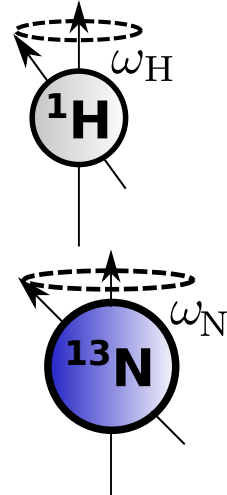

$$\frac{1}{T_1} = \frac{d_{\text{NH}}^2 N_{\text{H}}}{20}[J(\omega_{\text{H}} - \omega_{\text{N}}) + 3J(\omega_{\text{N}}) + 6J(\omega_{\text{H}} + \omega_{\text{N}})] \tag{1}$$

$$\frac{1}{T_2} = \frac{1}{2}\frac{d_{\text{NH}}^2 N_{\text{H}}}{20}[4J(0) + J(\omega_{\text{H}} - \omega_{\text{N}}) + 3J(\omega_{\text{N}}) + 3J(\omega_{\text{H}}) + 6J(\omega_{\text{H}} + \omega_{\text{N}})] \tag{2}$$

$$\text{NOE} = 1 + \frac{d_{\text{NH}}^2 N_{\text{H}}}{20}[J(\omega_{\text{H}} + 6J(\omega_{\text{H}} + \omega_{\text{N}})]\frac{\gamma_{\text{H}} T_1}{\gamma_{\text{N}}} \tag{3}$$

spectral density

$$J(\omega) = 2\int_0^\infty C(t)cos(\omega t)\mathrm{d}t$$

where

$$\tag{4}$$

is the spectral density, and

$$C(t) = \left\langle \frac{3}{2}\cos^2\theta_{t'+t} - \frac{1}{2} \right\rangle_{t'} \tag{5}$$