Info: Computed up to $\boldsymbol{N}^4$, max anticommutator value $\boldsymbol{N}^2$

Term symbol: $^2\Sigma$: $\quad S = 1/2,\ \Lambda = 0$

Basis states $|\Lambda, \Sigma, \Omega\rangle$**:**

- $|\pm 0,\ -1/2,\ -1/2\rangle$
- $|\pm 0,\ +1/2,\ +1/2\rangle$

Hamiltonian matrix:

$$\begin{bmatrix} Bx + \frac{B}{4} - Dx^2 - \frac{3Dx}{2} - \frac{5D}{16} - \frac{\gamma}{2} - \gamma_D x - \frac{\gamma_D}{4} & \frac{\sqrt{4x+1}(-8B+4D(4x+1)+4\gamma+\gamma_D(4x+5))}{16} \\ \frac{\sqrt{4x+1}(-8B+4D(4x+1)+4\gamma+\gamma_D(4x+5))}{16} & Bx + \frac{B}{4} - Dx^2 - \frac{3Dx}{2} - \frac{5D}{16} - \frac{\gamma}{2} - \gamma_D x - \frac{\gamma_D}{4} \end{bmatrix}$$

Eigenvalues:

$$F_1 = Bx + \frac{B}{4} - Dx^2 - \frac{3Dx}{2} - \frac{5D}{16} - \frac{\gamma}{2} - \gamma_D x - \frac{\gamma_D}{4} - \sqrt{4x+1}\left(-\frac{B}{2} + Dx + \frac{D}{4} + \frac{\gamma}{4} + \frac{\gamma_D x}{4} + \frac{5\gamma_D}{16}\right)$$

$$F_2 = Bx + \frac{B}{4} - Dx^2 - \frac{3Dx}{2} - \frac{5D}{16} - \frac{\gamma}{2} - \gamma_D x - \frac{\gamma_D}{4} + \sqrt{4x+1}\left(-\frac{B}{2} + Dx + \frac{D}{4} + \frac{\gamma}{4} + \frac{\gamma_D x}{4} + \frac{5\gamma_D}{16}\right)$$