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 $H = H_r + H_{so} + H_{ss} + H_{sr} + H_{ld}$:

$$H_r = BN^2 - DN^4$$
$$H_{so} = 0$$
$$H_{ss} = 0$$
$$H_{sr} = \gamma N \cdot S + \frac{\gamma_D \left[N \cdot S, N^2\right]_+}{2}$$
$$H_{ld} = 0$$

Hamiltonian matrix:

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

Eigenvalues:

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

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