

Lab-5

Problem

$$\hat{\mathbf{L}}\psi(t) = f(t) \quad (1)$$

where

$$\hat{\mathbf{L}} \equiv \frac{d^2}{dt^2} + \Omega^2(t) , \quad (2)$$

$$\Omega^2(t) = \Omega_0^2 e^{-\sigma t} (1 + \alpha \cos(\Omega_1 t)) , \quad (3)$$

$$f(t) = \int \left\{ J_n(\beta t) + J_{n+1} \left(\beta t - \frac{\pi}{4} \right) \right\} dt , \quad (4)$$

Parameters

$$\Omega_0 = 2 ,$$

$$\Omega_1 = 0.5 ,$$

$$\sigma = 0.01 ,$$

$$\alpha = 0.2 ,$$

Task

1. Find $\psi(t, \beta)$: $t = (0, 100)$, for any $\beta = (0.5, 5)$.
2. Find spectral distribution $\Psi(\omega, \beta)$ for any $\beta = (0.5, 5)$.
3. Plot 2D surface $|\Psi^2(\omega, \beta)|$ for $\beta = (0.5, 5)$.