$$\frac{d\omega_b^2}{dt} = (\gamma_L - \gamma_d)\omega_b^2 - \frac{\gamma_L}{2}\int_{t/2}^{t} dt_1 \int_{t-t_1}^{t_1} dt_2 (t-t_1)^2 \\ e^{-\nu_a(2t-t_1-t_2)}\omega_b^2(t_1)\omega_b^2(t_2)\omega_b^2(t+t_2-t_1). \tag{1}$$