$$\frac{d\hat{Q}_n}{dt} = \frac{\hat{\Phi}_{n+1} + \hat{\Phi}_{n-1} - 2\hat{\Phi}_n}{L_0 x_1},$$

$$\frac{d\hat{\Phi}_n}{dt} = \frac{\hat{Q}_n}{C_0 x_1} \quad (n \neq 0),$$

$$\frac{d\hat{\Phi}_0}{dt} = \frac{\hat{Q}_0}{C_c} + \frac{\hat{Q}_0}{C_J} + \frac{\hat{Q}_J}{C_J}.$$