$$\partial_t \underbrace{M(r,z,t)}_{\text{DAMPs}} = \underbrace{\frac{1}{r}\partial_r(rD_M M_r) + \partial_{zz} D_M M}_{\text{diffusion}} - \underbrace{\delta_M M}_{\text{natural decay}} \tag{1a}$$

$$+ \underbrace{\sigma_M D_N}_{\text{production by } D_N} + \underbrace{\sigma_U U \frac{F}{\lambda_F + F}}_{\text{production by ECM}},$$

$$\partial_t \underbrace{F(r,z,t)}_{\text{PIC}} = \underbrace{\frac{1}{r}\partial_r(rD_F F_r) + \partial_{zz} D_F F}_{\text{diffusion}} - \underbrace{\delta_F F}_{\text{natural decay}} \tag{1b}$$

$$+ \underbrace{\sigma_F S_T}_{\text{production by } S_T},$$

$$\partial_t \underbrace{P(r,z,t)}_{\text{EPO}} = \underbrace{\frac{1}{r}\partial_r(rD_P P_r) + \partial_{zz} D_P P}_{\text{diffusion}} - \underbrace{\delta_P P}_{\text{natural decay}} \tag{1c}$$

$$+ \underbrace{\sigma_P C_E \frac{\Lambda}{\Lambda + F}}_{\text{production by } C_E \text{ controlled by PIC}},$$

with no flux boundary conditions on the spatial domain $0 \leq r \leq r_{\max}$ and $0 \leq z \leq z_{\max}$, and initial conditions

$$M(r,z,0) = F(r,z,0) = P(r,z,0) = 0. \tag{1d}$$

$$\partial_t \underbrace{U(r,z,t)}_{ECM} = \underbrace{-\delta_U U \frac{F}{\lambda_F + F} H(P_c - P)}_{\text{degradation by PIC under the control of EPO}}, \tag{2a}$$

with initial condition

$$U(r,z,0) = 30\text{mg}. \tag{2b}$$