0.1 Variables

Phase variables: $N(t)$
Control parameters: $C(t,1),\ C(t,2),\ \pi(t)$
Exogenous parameters: $p_1(t),\ p_2(t)$

0.2 Optimality conditions

0.2.1 Euler equations

- $\frac{d}{dt}\alpha_0(t) = 0$

0.2.2 Control optimality conditions

- $\frac{a_h \lambda_0 rho_h \left(a_h C^{rho_h}(t,1) + \left((1-a_h) C^{rho_h}(t,2)\right)^{\frac{1}{rho_h}}\right)^{1-\beta} C^{rho_h}(t,1) e^{-delta_h t}}{\left(a_h C^{rho_h}(t,1) + \left((1-a_h) C^{rho_h}(t,2)\right)^{\frac{1}{rho_h}}\right) C(t,1)} + \alpha_0(t) p_1(t) = 0$
- $\frac{\lambda_0 \left((1-a_h) C^{rho_h}(t,2)\right)^{\frac{1}{rho_h}} \left(a_h C^{rho_h}(t,1) + \left((1-a_h) C^{rho_h}(t,2)\right)^{\frac{1}{rho_h}}\right)^{1-\beta} e^{-delta_h t}}{\left(a_h C^{rho_h}(t,1) + \left((1-a_h) C^{rho_h}(t,2)\right)^{\frac{1}{rho_h}}\right) C(t,2)} + \alpha_0(t) p_2(t) = 0$
- $-\alpha_0(t) = 0$

0.2.3 Transversality conditions

- $\alpha_0(0) = 0$
- $\alpha_0(T) = -\lambda_1$

0.2.4 Dual feasibility and Complementary slackness conditions

- $\lambda_1 \geq 0$
- $\lambda_1 N(T) = 0$