

₁ where, $A = (1 + \gamma\phi)\beta\varepsilon - \alpha(\beta\delta_1 - \delta\chi)$ and $B = \alpha N(\beta - \delta) + \beta\gamma$, such that $\omega^2 = A^2 - 4\beta B =$
₂ $((1 - \gamma)\beta - \alpha(\beta - \delta))^2 - 4\alpha\beta(N + \gamma)(\beta - \delta)$. The roots $x_i^*, i = 1, 2$ will be distinct and positive
₃ when $A > 0$ and $\omega^2 > 0$ which gives $(1 + \gamma)\beta > (\alpha - \delta)$ and $(\alpha - \delta - \beta(1 - \gamma))^2 > 4\beta(\alpha\phi - \delta)(N + \gamma\varepsilon)$
₄ where $\alpha > \delta$.