

$$q_c(n) = Q\left(\frac{R_f}{R_f + R_c}\right) \left[1 - \left(\frac{e^{\beta \cdot n}}{e^{\beta} + e^{\beta \cdot N}} + \frac{e^{-\beta \cdot n}}{e^{-\beta} + e^{-\beta \cdot N}} \right) \right]$$