

$$E_{no}^2 = E_s^2 \left(\frac{X_{cp}}{R_s + X_{cp}} \right)^2 + E_n^2 + \int_n^2 \left(\frac{X_{cp} \cdot R_s}{X_{cp} + R_s} \right)^2$$

$$K_t^2 = \left(\frac{X_{cp}}{R_s + X_{cp}} \right)^2$$

$$\frac{X_{cp}}{R_s + X_{cp}} = \frac{\frac{1}{j\omega C_p}}{R_s + \frac{1}{j\omega C_p}} = \frac{1}{1 + j\omega R_s C_p} = \frac{1 - j\omega R_s C_p}{1 + \omega^2 R_s^2 C_p^2}$$

$$\left| \frac{X_{cp}}{R_s + X_{cp}} \right|^2 = \frac{1 + \omega^2 R_s^2 C_p^2}{(1 + \omega^2 R_s^2 C_p^2)^2} = \frac{1}{1 + \omega^2 R_s^2 C_p^2}$$

$$\frac{X_{cp} \cdot R_s}{X_{cp} + R_s} = \frac{\frac{1}{j\omega C_p} \cdot R_s}{\frac{1}{j\omega C_p} + R_s} = \frac{R_s}{1 + j\omega C_p R_s} = \frac{R_s (1 - j\omega R_s C_p)}{1 + \omega^2 R_s^2 C_p^2}$$

$$\left| \frac{X_{cp} \cdot R_s}{X_{cp} + R_s} \right|^2 = \frac{R_s^2 + \omega^2 R_s^4 C_p^2}{(1 + \omega^2 R_s^2 C_p^2)^2} = \frac{R_s^2 (1 + \omega^2 R_s^2 C_p^2)}{(1 + \omega^2 R_s^2 C_p^2)^2} = \frac{R_s^2}{1 + \omega^2 R_s^2 C_p^2}$$

$$E_{ni}^2 = \frac{E_{no}^2}{K_t^2} = \frac{E_s^2 \left(\frac{X_{cp}}{R_s + X_{cp}} \right)^2 + E_n^2 + \int_n^2 \left(\frac{X_{cp} \cdot R_s}{X_{cp} + R_s} \right)^2}{\left(\frac{X_{cp}}{R_s + X_{cp}} \right)^2} =$$

$$E_s^2 + (1 + \omega^2 R_s^2 C_p^2) E_n^2 + \int_n^2 R_s^2$$