Fabry-Perot related formulas: summary.

$$I_T = I_0 \frac{T^2}{1 + R^2 - 2R\cos\Delta} = I_0 \frac{T^2}{(1-R)^2} \frac{1}{1 + F\sin^2(\Delta/2)}$$

$$\Delta = \delta + \delta_r \quad , \quad \delta = 2kd\cos\Theta = \frac{4\pi nd}{\lambda}\cos\Theta$$

Coefficient of finesse:

$$F = \frac{4R}{(1-R)^2} = \left(\frac{2r}{1-r^2}\right)^2$$

Max and min transmission:

$$A + T + R = 1$$

$$I_{max}/I_0 = \frac{T^2}{(1-R)^2} = \left(\frac{1-A-R}{1-R}\right)^2$$

$$I_{min}/I_0 = \frac{T^2}{(1+R)^2}$$

FWHM of fringes:

$$\delta\Delta = \frac{4}{\sqrt{F}} = \frac{2(1-R)}{\sqrt{R}} = \frac{2\pi}{\mathcal{F}}$$

Finesse:

$$\mathcal{F} \equiv \frac{2\pi}{\delta\Delta} = \frac{\pi}{2}\sqrt{F} = \pi\frac{\sqrt{R}}{1-R}$$

Free spectral range = separation between adjacent orders of interference:

$$\nu_F = \frac{c}{2nd}$$

Fabry-Perot cavity modes:

$$\nu_{n+1} - \nu_n = \frac{c}{2nd} = \nu_F$$

Resolving power:

$$RP = \frac{\omega}{\delta\omega} = \frac{\nu}{\delta\nu} = \frac{\lambda}{\delta\lambda}$$

$$RP = N\mathcal{F}$$