Lorentzian

General Equation

$$\boxed{\frac{Ae^{i\theta}}{f - f_0 + i\gamma}}$$

Mutltiple by complex conjugate.

$$\frac{Ae^{i\theta}}{f - f_0 + i\gamma} * \frac{(f - f_0)}{(f - f_0)} \tag{1}$$

$$\frac{A}{(f - f_0)^2 + \gamma^2}[(f - f_0)\cos(\theta) + \gamma\sin(\theta)) + i((f - f_0)\sin(\theta) - \gamma(\cos(\theta)))] \tag{2}$$