Filtres

Ordre 1 - Passe bas

Transmittance complexe :

$$\underline{T} = T_0 \times \frac{1}{1 + \mathrm{j}\frac{f}{f_0}}$$

Transmittance :

$$T = T_0 \times \frac{1}{\sqrt{1 + (\frac{f}{f_0})^2}}$$

Gain :

$$G = G_0 - 20\log(\sqrt{1 + (\frac{f}{f_0})^2}$$

Phase :

$$\varphi = -\arctan(\frac{f}{f_0})$$

Ordre 2 - Passe haut

Transmittance complexe :

$$\boxed{\underline{T} = T_0 \times \frac{\mathrm{j}\frac{f}{f_0}}{1 + \mathrm{j}\frac{f}{f_0}}}$$

Transmittance

$$T = T_0 \times \frac{\frac{f}{f_0}}{\sqrt{1 + (\frac{f}{f_0})^2}}$$

Gain :

$$G = G_0 + 20\log(\frac{f}{f_0}) - 20\log(\sqrt{1 + (\frac{f}{f_0})^2})$$

Phase :

$$\varphi = 90 - \arctan(\frac{f}{f_0})$$

Ordre 2 - Passe bas

Transmittance complexe :

$$\underline{T} = T_0 \times \frac{1}{1 + 2m\mathrm{j}\frac{f}{f_0} + (\mathrm{j}\frac{f}{f_0})^2} \quad \Longrightarrow \quad \underline{T} = T_0 \times \frac{1}{[1 - \frac{f^2}{f_0^2}] + \mathrm{j}[2m\frac{f}{f_0}]}$$

Transmittance :

$$T = T_0 \times \frac{1}{\sqrt{(1 - \frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}}$$

Gain :

$$G = G_0 - 20\log(\sqrt{(1 - \frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}$$

Phase :

$$\varphi = -\arctan(\frac{2m\frac{f}{f_0}}{1 - \frac{f^2}{f_0^2}})$$

Ordre 2 - Passe haut

Transmittance complexe :

$$\underline{T} = T_0 \times \frac{\mathrm{j}[\frac{f^2}{f_0^2}]}{1 + 2m\mathrm{j}\frac{f}{f_0} + (\mathrm{j}\frac{f}{f_0})^2} \quad \Longrightarrow \quad \underline{T} = T_0 \times \frac{-\frac{f^2}{f_0^2}}{[1 - \frac{f^2}{f_0^2}] + \mathrm{j}[2m\frac{f}{f_0}]}$$

Transmittance :

$$T = T_0 \times \frac{\frac{f^2}{f_0^2}}{\sqrt{(1-\frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}}$$

Gain :

$$G = G_0 + 20\log(\frac{f^2}{f_0^2}) - 20\log(\sqrt{(1-\frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}$$

Phase :

$$\varphi = 180 - \arctan(\frac{2m\frac{f}{f_0}}{1-\frac{f^2}{f_0^2}})$$

Ordre 2 - Passe bande

Transmittance complexe :

$$\underline{T} = T_0 \times \frac{2m\mathrm{j}\frac{f}{f_0}}{1 + 2m\mathrm{j}\frac{f}{f_0} + (\mathrm{j}\frac{f}{f_0})^2} \quad \Longrightarrow \quad \underline{T} = T_0 \times \frac{\mathrm{j}[2m\frac{f}{f_0}]}{[1-\frac{f^2}{f_0^2}] + \mathrm{j}[2m\frac{f}{f_0}]}$$

Transmittance :

$$T = T_0 \times \frac{2m\frac{f}{f_0}}{\sqrt{(1-\frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}}$$

Gain :

$$G = G_0 + 20\log(2m\frac{f}{f_0}) - 20\log(\sqrt{(1-\frac{f^2}{f_0^2})^2 + (2m\frac{f}{f_0})^2}$$

Phase :

$$\varphi = 90 - \arctan(\frac{2m\frac{f}{f_0}}{1-\frac{f^2}{f_0^2}})$$