

Filter Responses

Electrical Engineering

Five classical approximations at the same order, and the compromise each one accepts.

Same order, same corner frequency, different priorities.

Response	Passband	Trade-off
Butterworth	Maximally flat	Gentle roll-off
Chebyshev type I	Equal ripple	Sharper cut, ripple in band
Chebyshev type II	Flat	Ripple moves to the stopband
Elliptic	Ripple	Sharpest cut for its order
Bessel	Flat group delay	Weakest attenuation

Bessel when pulse shape matters, elliptic when the transition band is tight. Order sets the ultimate roll-off rate.