# Filter Wizard

Filter Wizard Design

Created on 06/22/2025

ANALOG DEVICES

# Filter Wizard Design Report

## Filter Requirements for Low-Pass, 4th order Butterworth

Specifications: Optimize: Specific Parts; +Vs: 5; -Vs: -5

Gain: 0 dB

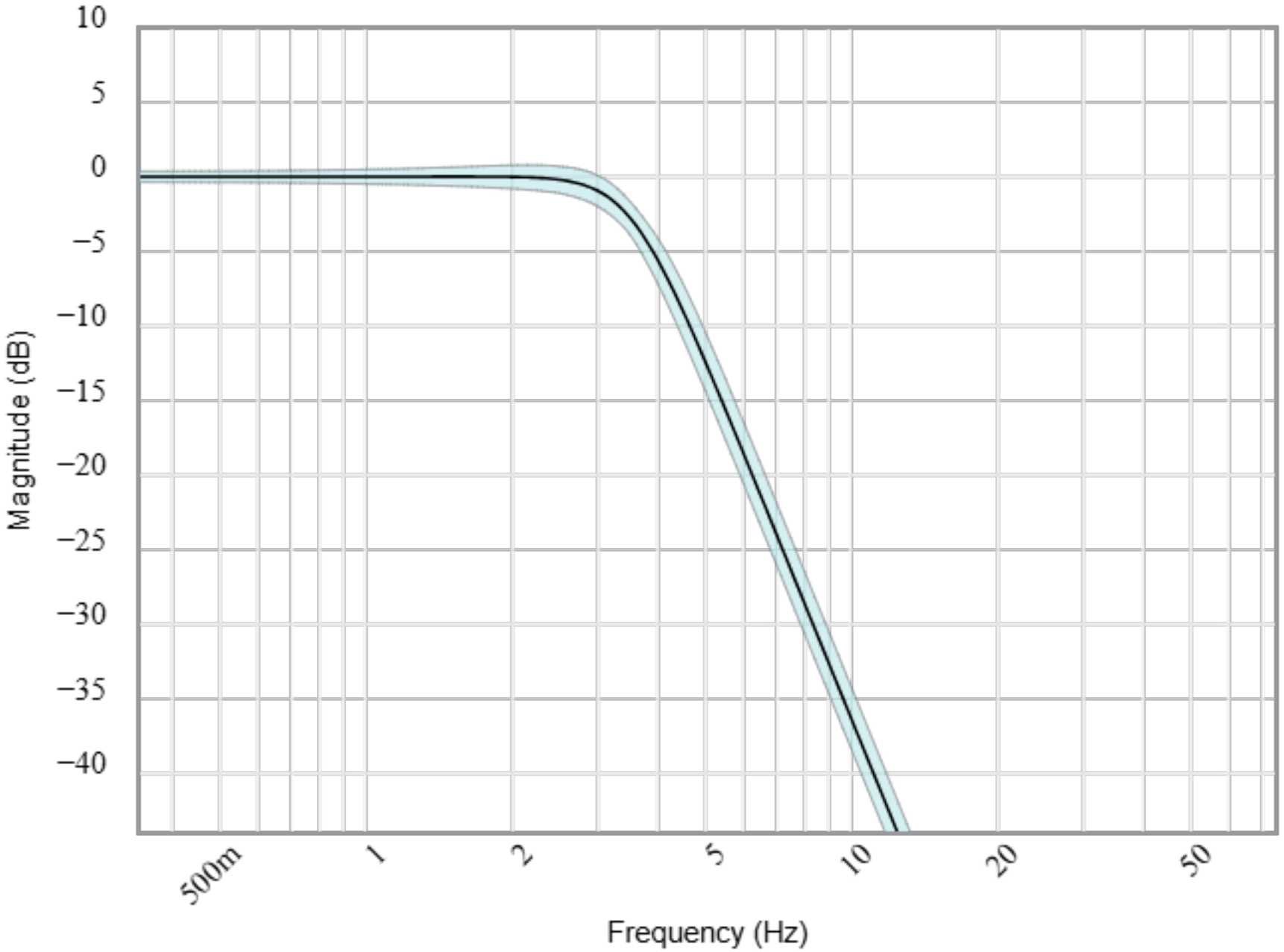
Passband: -3dB at 3.5Hz

Stopband: -24dB at 7.5Hz

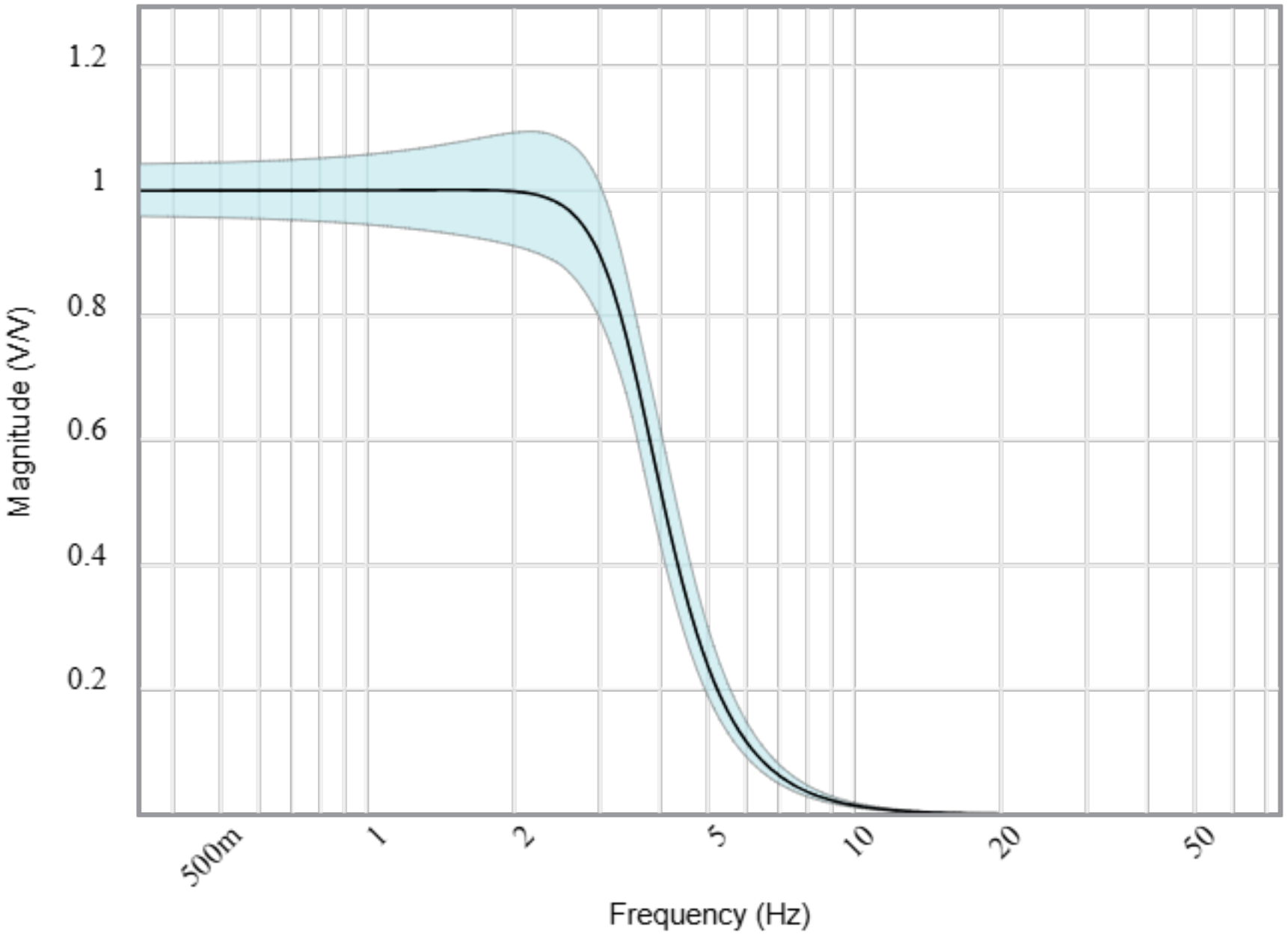
Component Tolerances: Capacitor = 5%; Resistor = 1%; Inductor = 5%; Op Amp GBW = 20%

BOM: refer to BOM.csv file

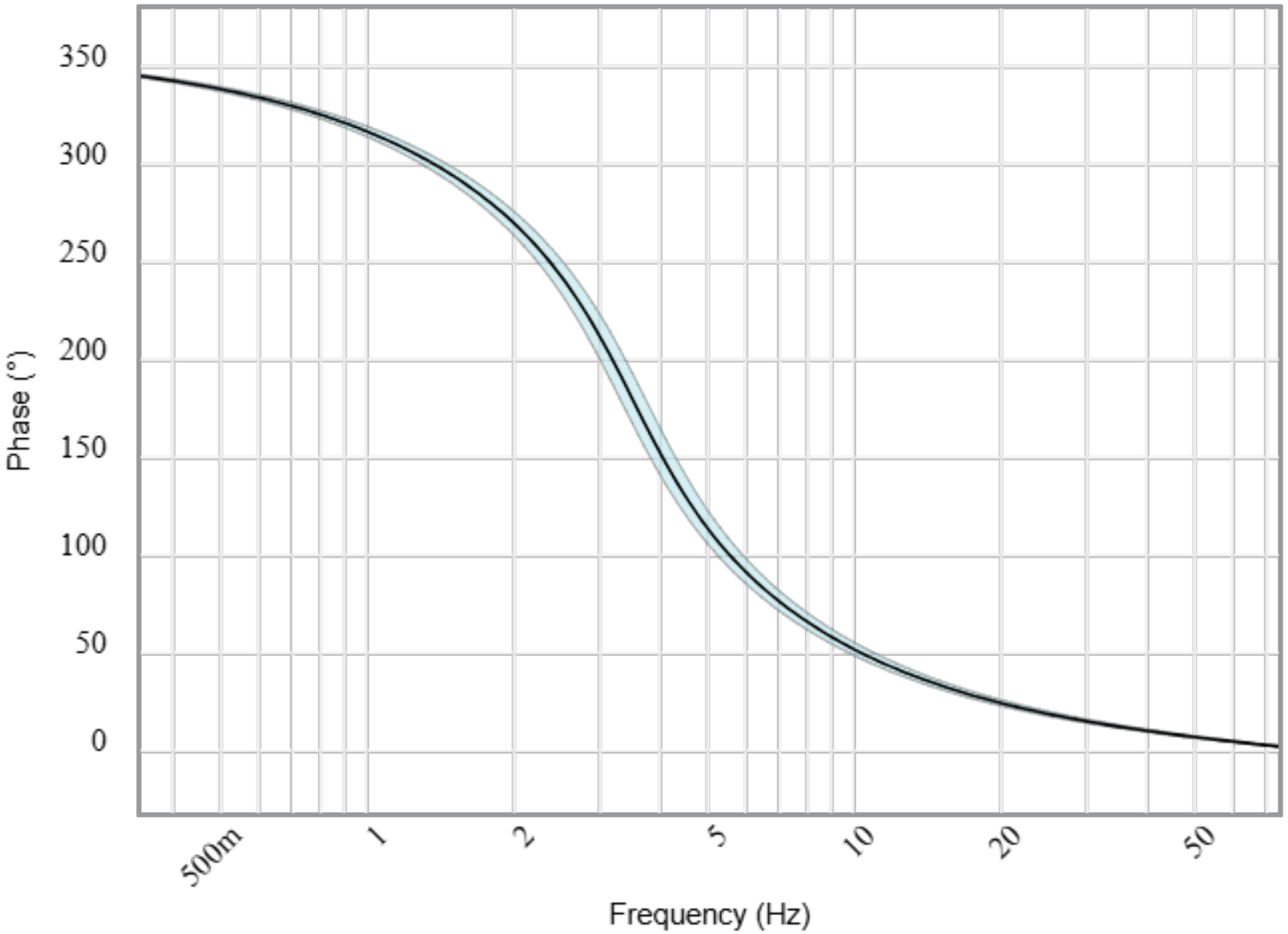
Magnitude(dB)



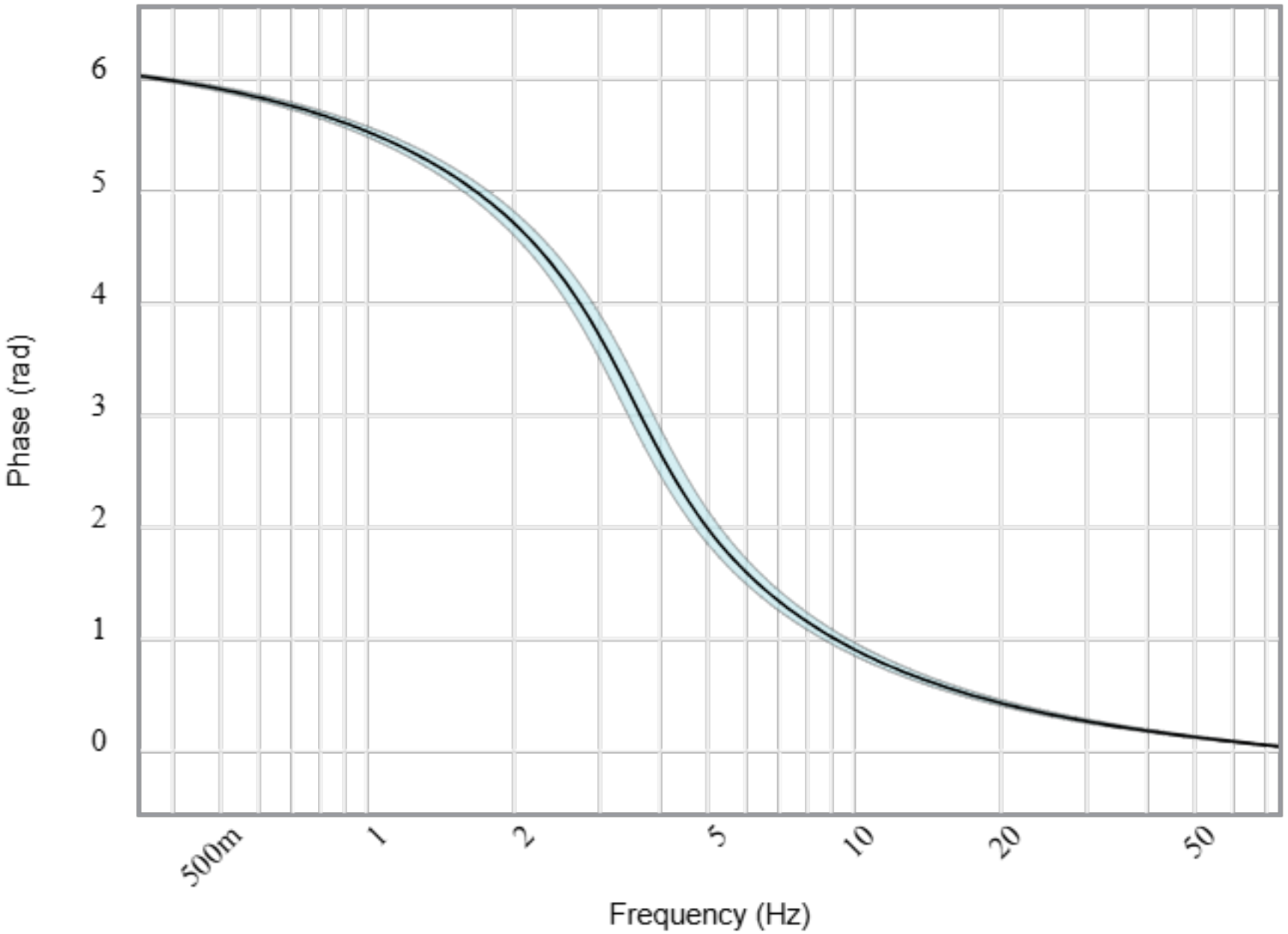
Magnitude(Volts per Volt)



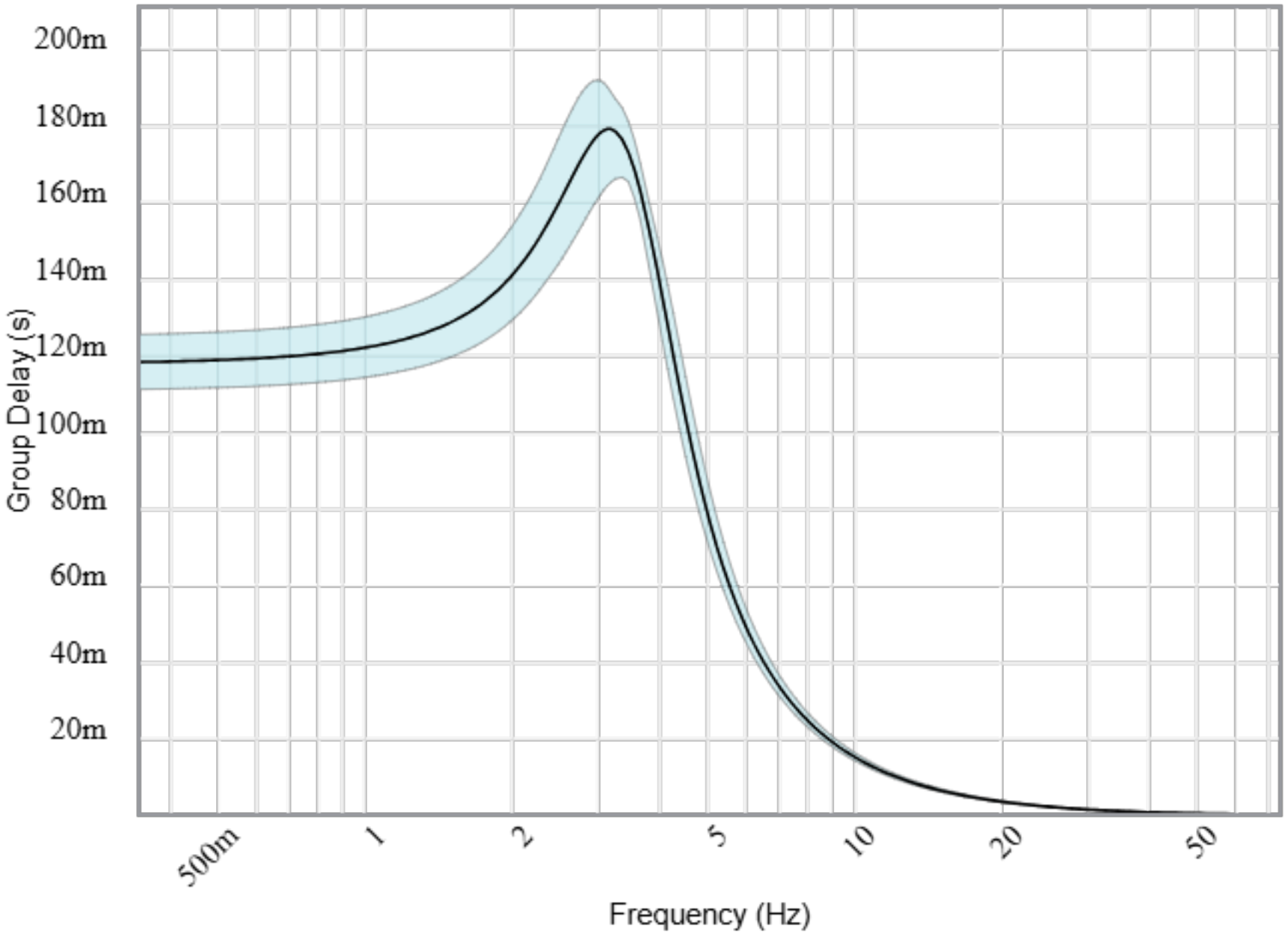
Phase(degrees)



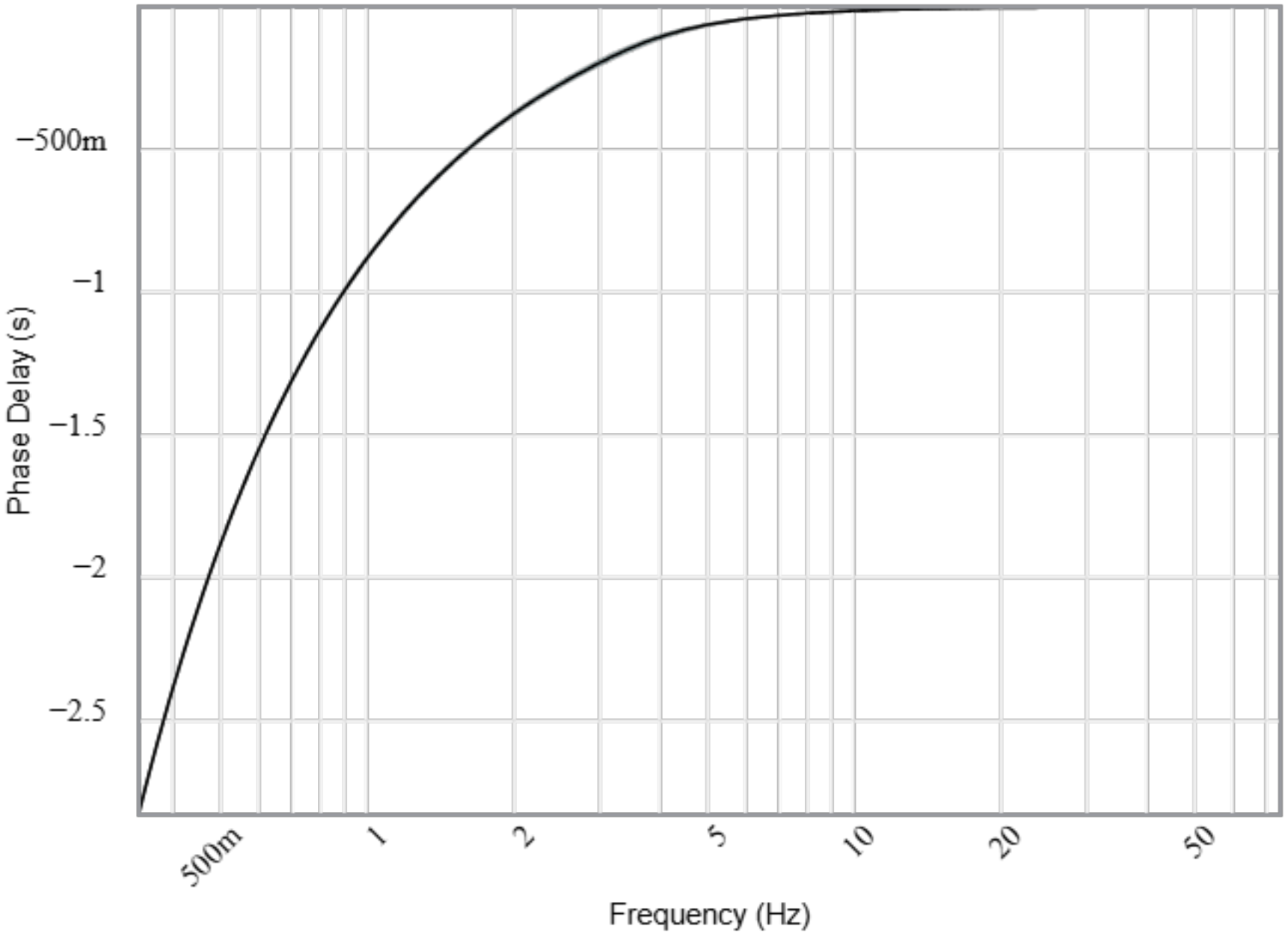
Phase(radians)



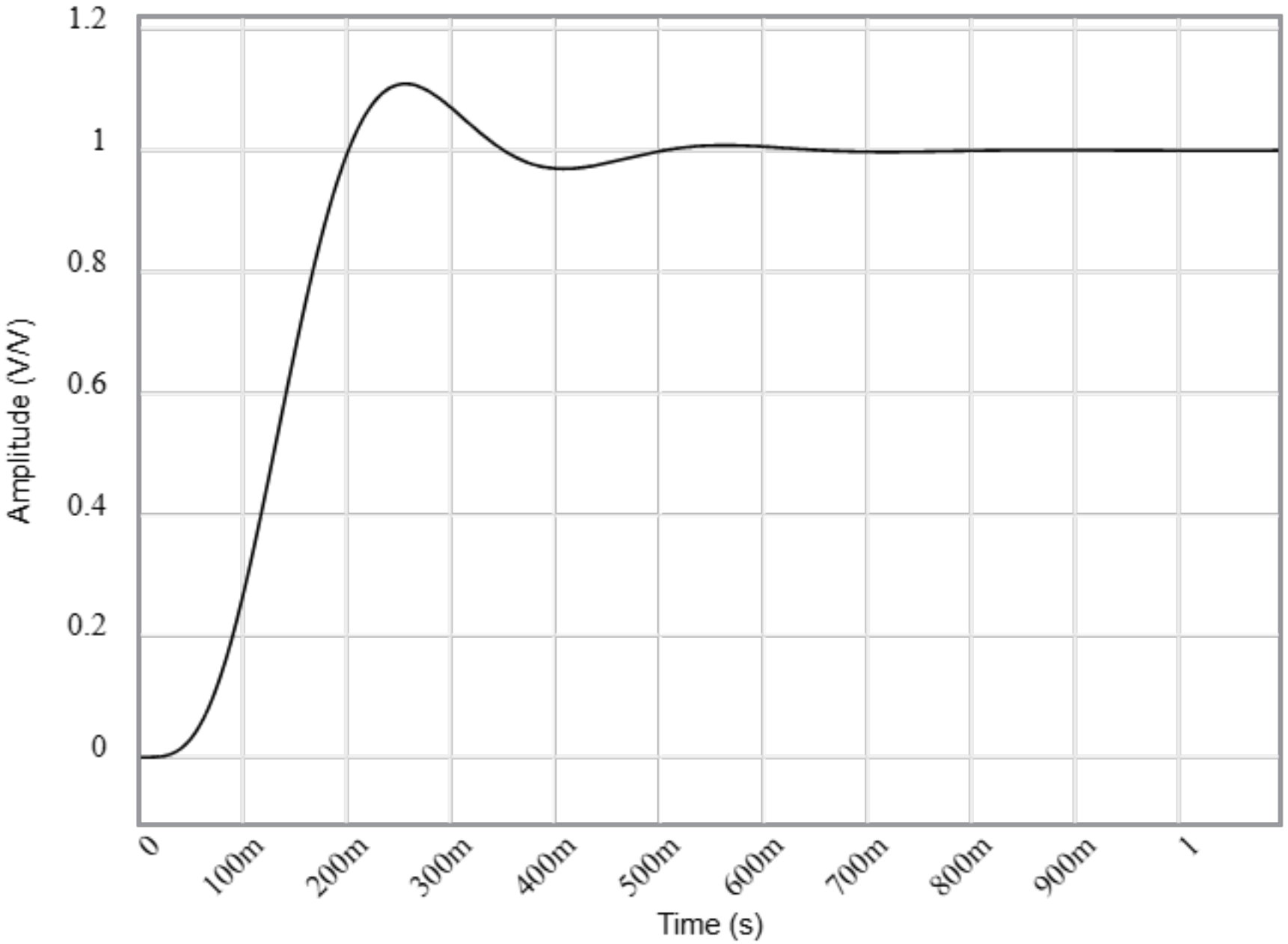
Group Delay


200m
180m
160m
140m
120m
100m
80m
60m
40m
20m
Group Delay (s)
500m
1
2
5
10
20
50
Frequency (Hz)

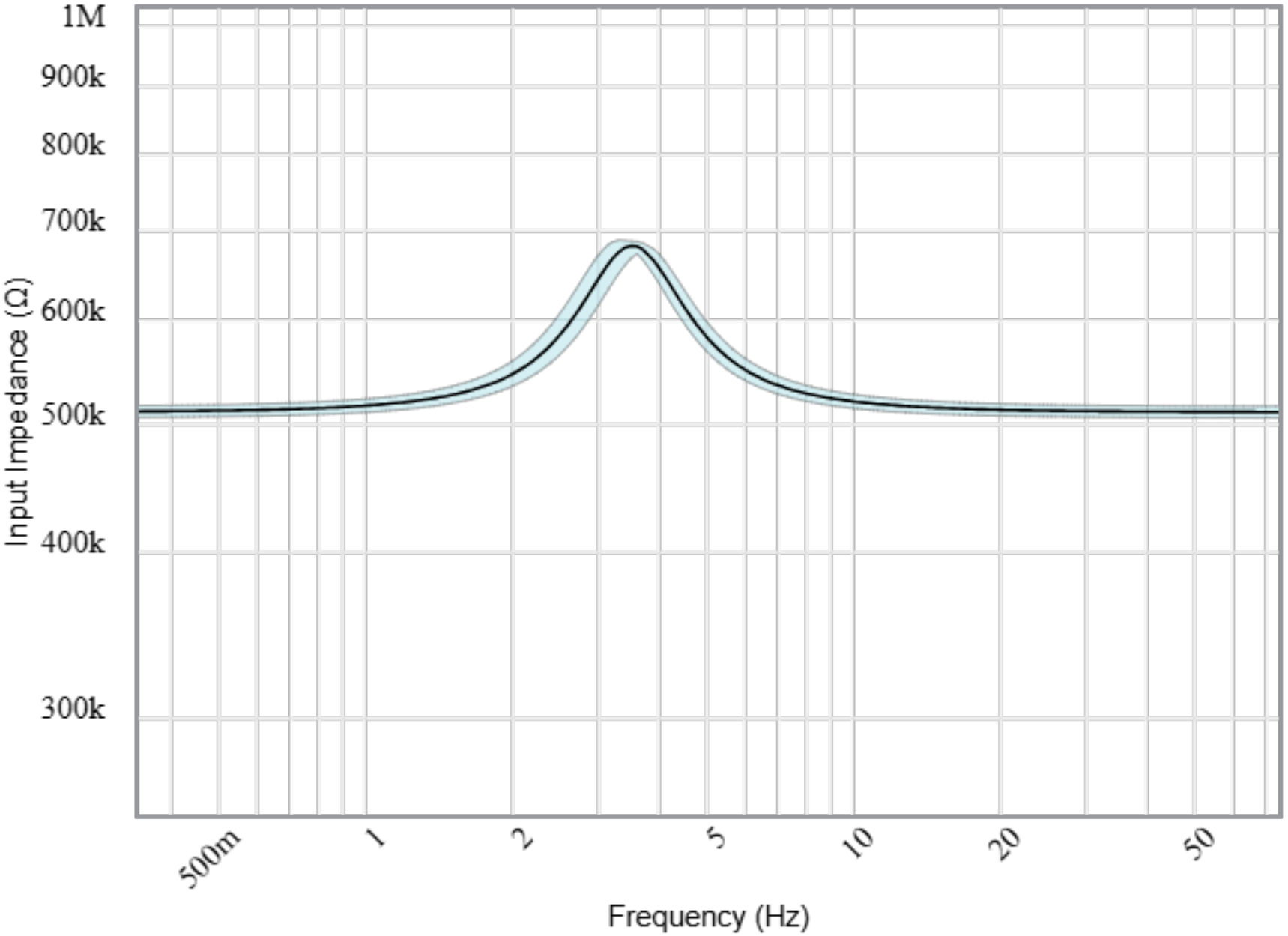
Phase Delay



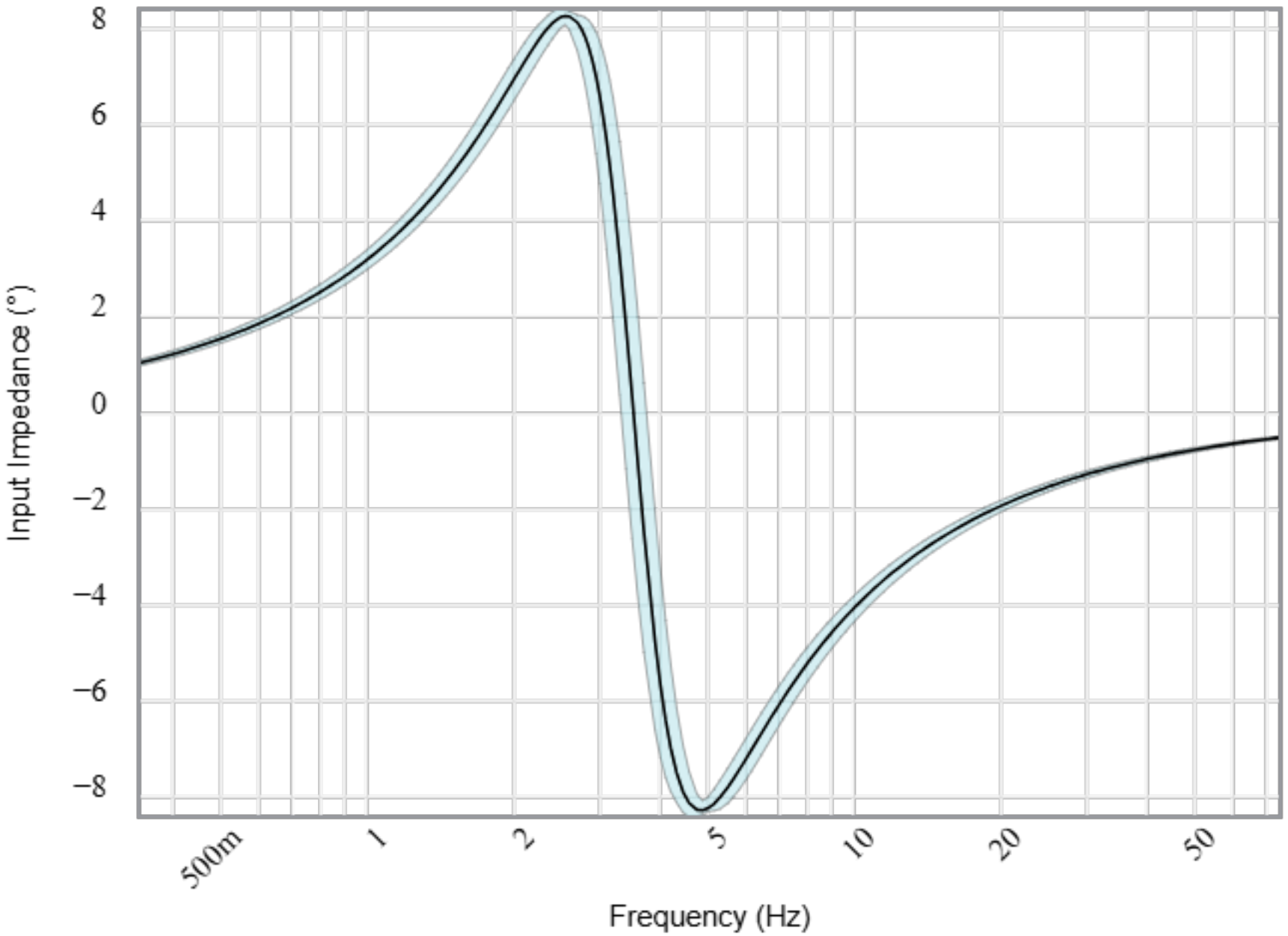
Step Response



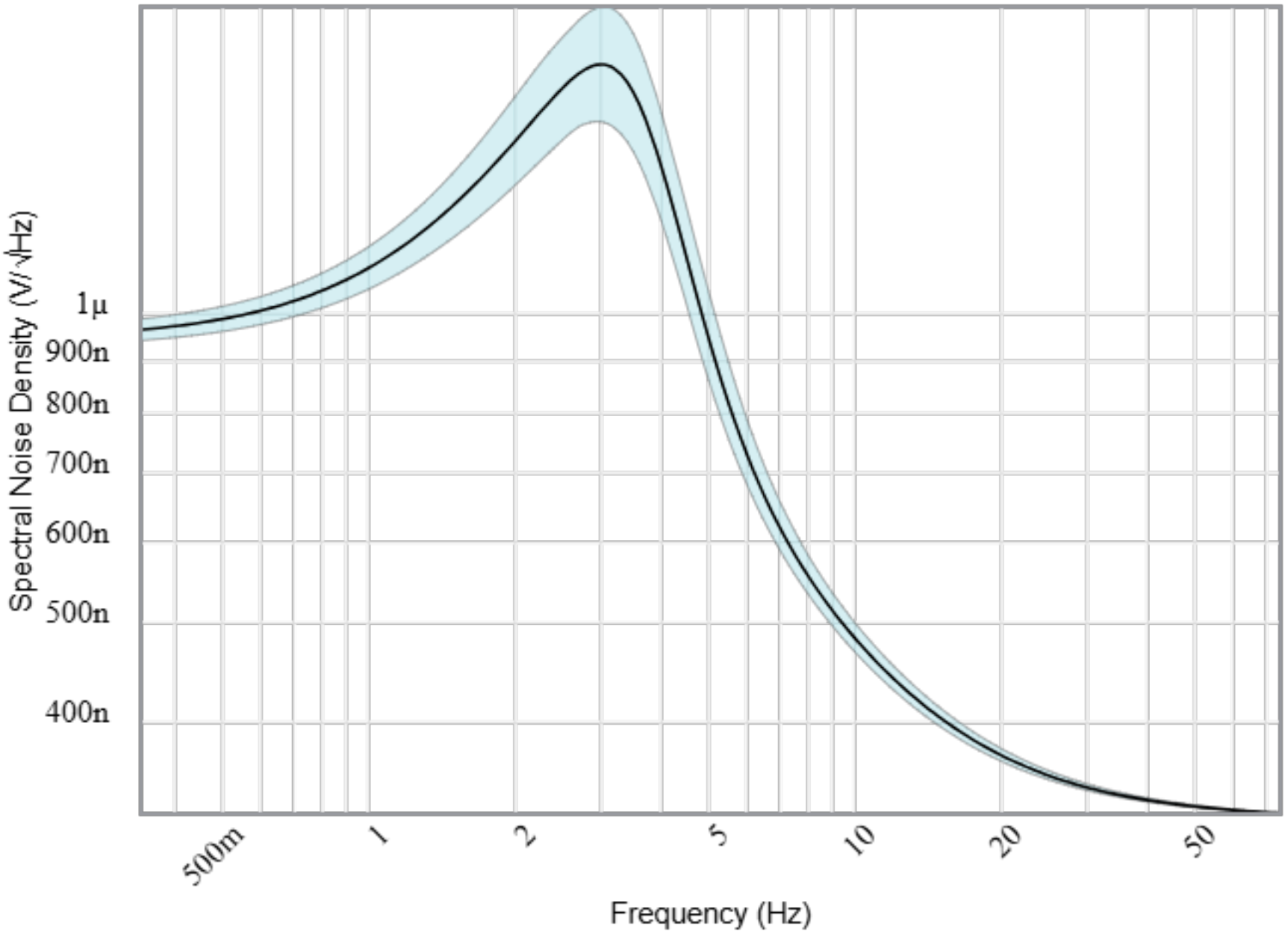
Input Impedance Magnitude



Input Impedance Phase



Noise


Spectral Noise Density (V/√Hz)
1µ
900n
800n
700n
600n
500n
400n
500m
1
2
5
10
20
50
Frequency (Hz)

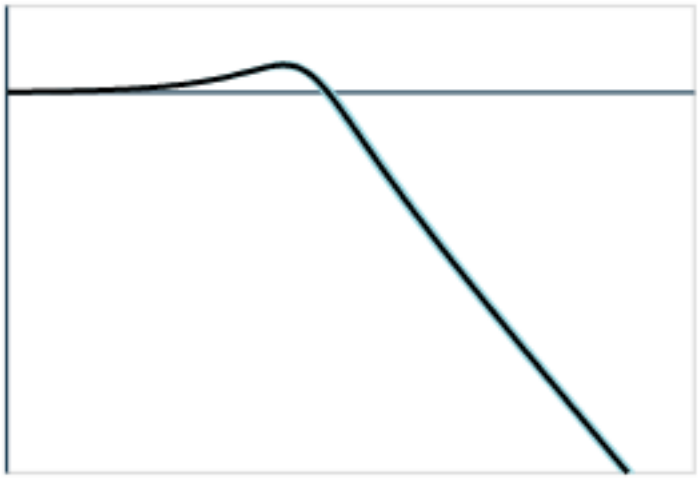
# Stages

Your filter requires 2 op amp stage(s) with the following characteristics

## A

**2nd order Low-Pass Multiple Feedback**

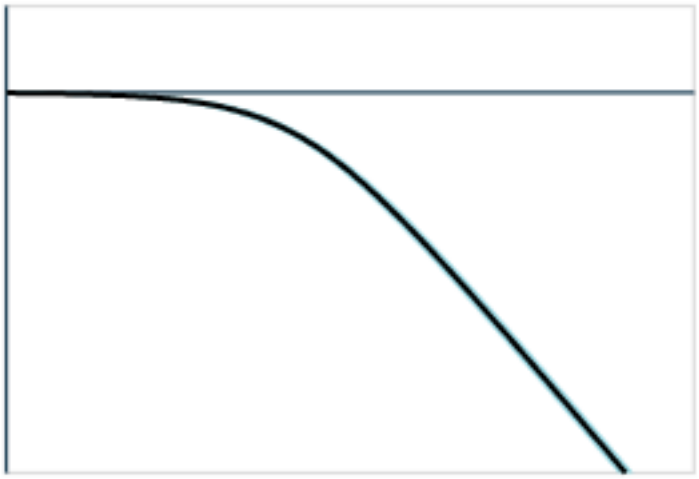
| | Target | Simulated |
|---|---|---|
| **Gain (V/V):** | 1 | 0.98 to 1.02 |
| **$f_p$ (Hz):** | 3.5 | 3.32 to 3.75 |
| **Q:** | 1.31 | 1.28 to 1.4 |



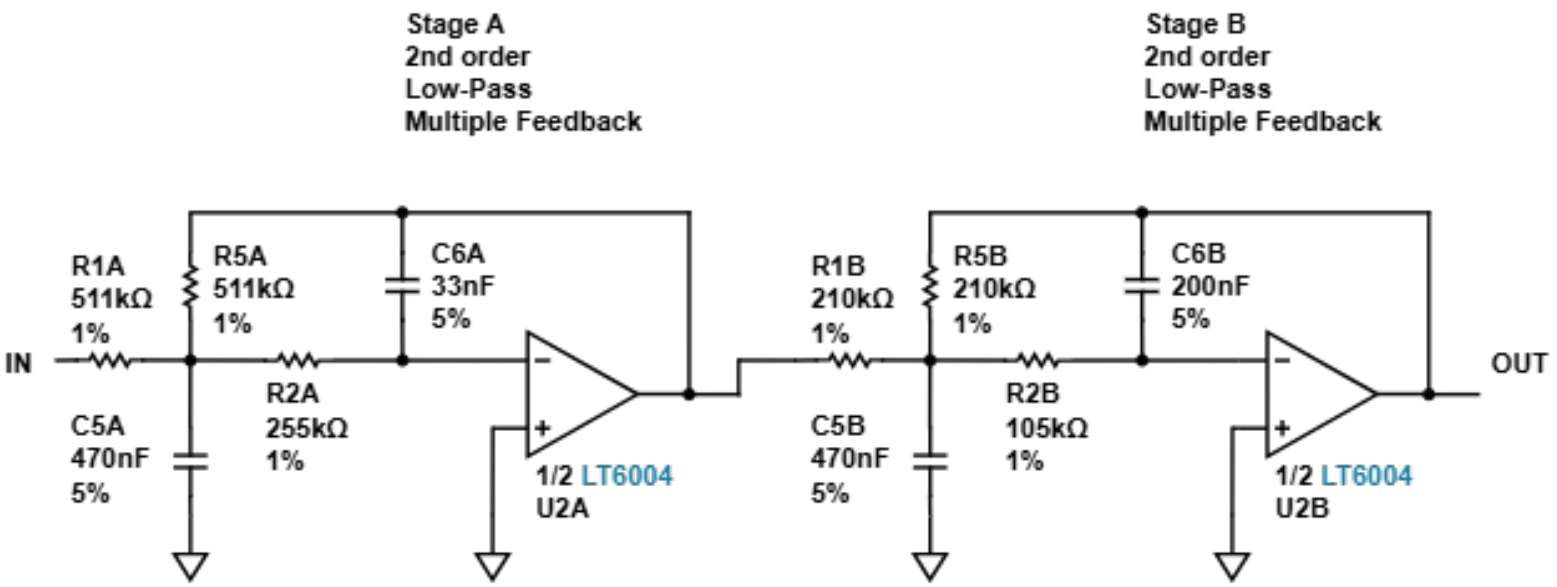
## B

**2nd order Low-Pass Multiple Feedback**

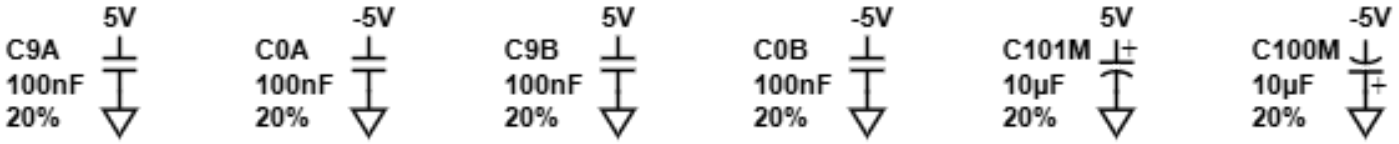
| Target | Simulated |
|---|---|
| 1 | 0.98 to 1.02 |
| 3.5 | 3.29 to 3.71 |
| 541m | 518m to 567m |



# Circuit




BYPASS CAPACITORS




SPARES Why The Spares?