

▾ bode

```

bode(H, f1, f2, n) :=
  R ← stack(f1, |h ← H(2π·f1·j)|, arg(h))
  for i ∈ 1..n
    t ← log(f1) + i·(log(f2) - log(f1))/n
    f ← 10t
    h ← H(2π·f·j)
    φ ← arg(h)
    φ ← φ - 2π·round( (φ - (R<cols(R)-1>)2) / 2π )
    R<cols(R)> ← (f |h| φ)T
  RT

```

```

bodex(H, f1, f2, n) :=
  R ← stack(f1, |h0 ← H(2π·f1·j)|, arg(h0))
  for i ∈ 1..n
    t ← log(f1) + i·(log(f2) - log(f1))/n
    f ← 10t
    h ← H(2π·f·j)
    φ ← (R<cols(R)-1>)2 + arg(h·h0-1)
    h0 ← h
    R<cols(R)> ← (f |h| φ)T
  RT

```

Old versions

```

bode(H, f1, f2, n) :=
  O ← ORIGIN
  for i ∈ O..O + n
    t ← log(f1) + (i - O)·(log(f2) - log(f1))/n
    fi ← 10t
    hi ← H(2π·fi·j)
  augment(f, |hi|, phasecor(phase(h)))

```

```

bode(H, f1, f2, n, corr) :=
  O ← ORIGIN
  for i ∈ O..O + n
    t ← log(f1) + (i - O)·(log(f2) - log(f1))/n
    fi ← 10t
    h ← H(2π·fi·j)
    h ← (h) if ¬isArray(h)
    magi ← ∏k=Olast(h) hk
    φi ← ∑ phase(h)
  φ ← phasecor(φ) if corr
  augment(f, mag, φ)

```

*New version which will accept either a function H or a vector of functions (factors)*

*Phase calculation after an idea from Fred Kohlhepp*

▴ bode

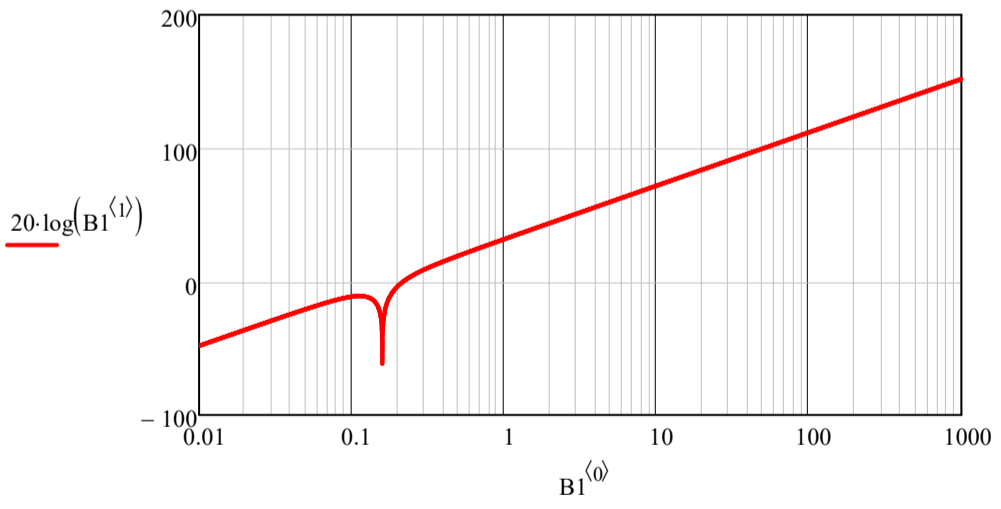
$$H1(s) := \frac{1}{s} \cdot \frac{1+s}{1+\frac{1}{s}} \cdot \frac{1+s^2}{1+\frac{1}{s}+\frac{1}{s^2}}$$

B1 := bode(H1, 0.01, 10<sup>3</sup>, 5000, 0) *phasecor would be counterproductive here!*

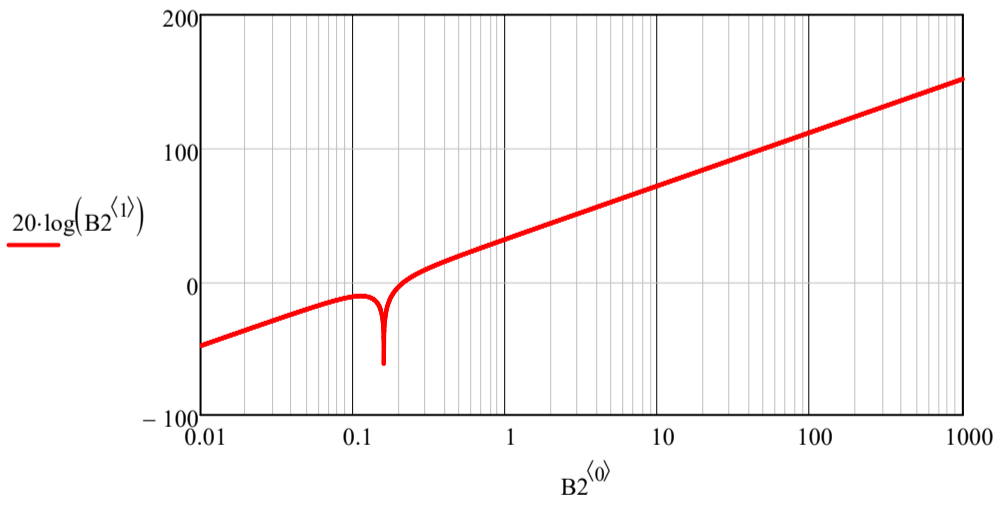
$$H2(s) := \left( \frac{1}{s} \frac{s+1}{\frac{1}{s}+1} \frac{s^2+1}{\frac{1}{s}+\frac{1}{s^2}+1} \right)^T$$

B2 := bode(H2, 0.01, 10<sup>3</sup>, 5000, 0)

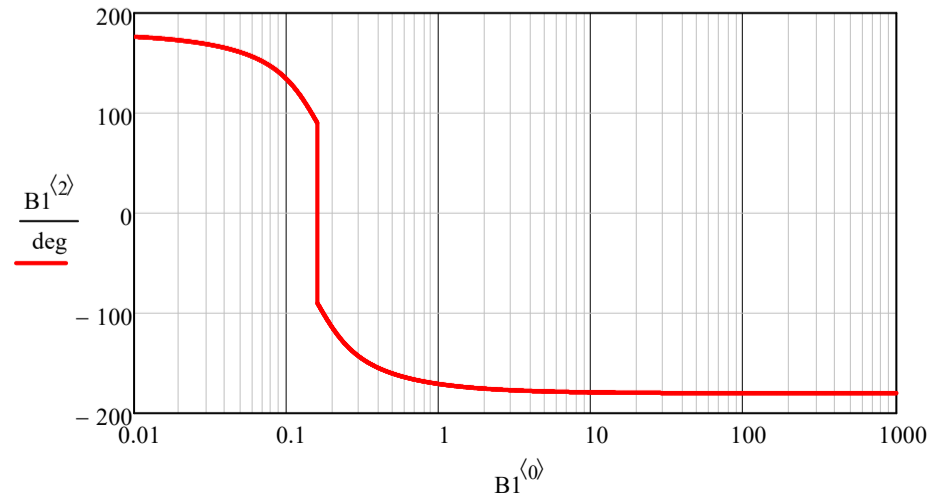
Magnitude Plot (dB)



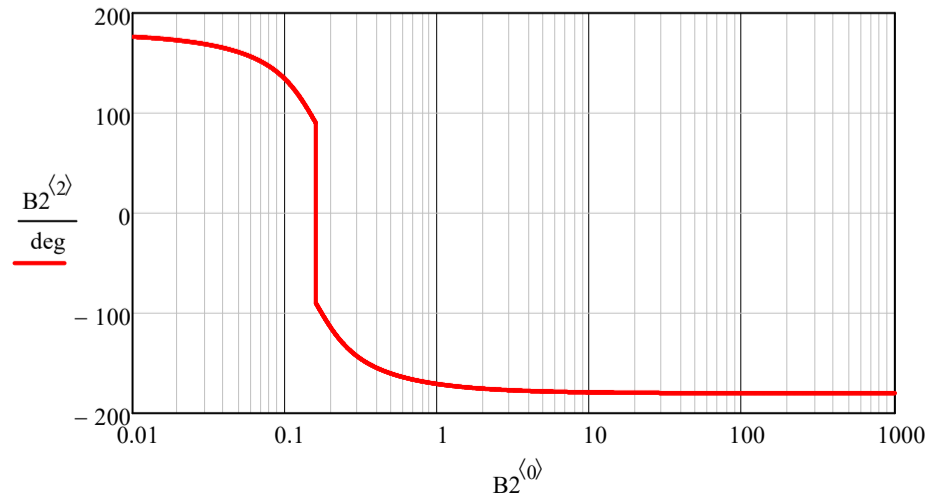
Magnitude Plot (dB)



Phase Plot



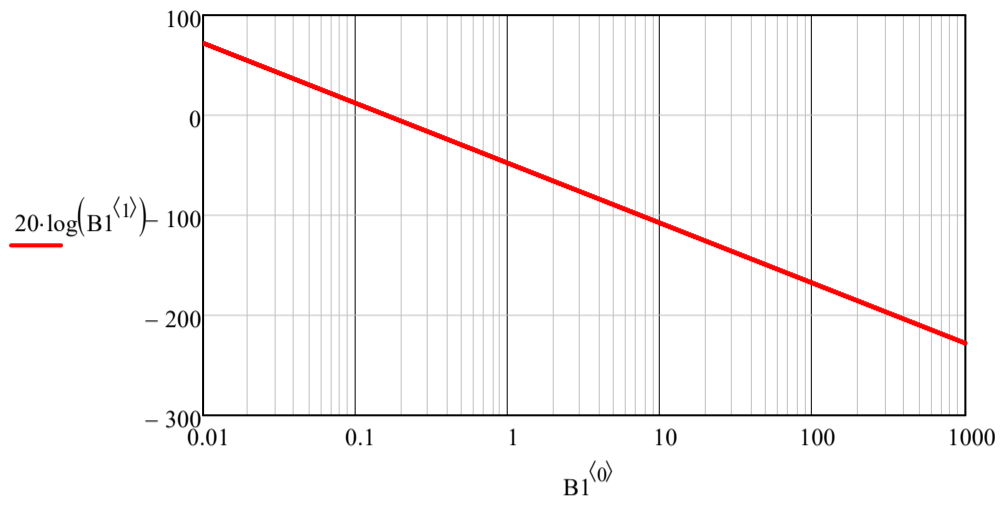
Phase Plot



$$H1(s) := \left(\frac{1}{s}\right)^3$$

$$B1 := \text{bode}(H1, 0.01, 10^3, 5000, 0)$$

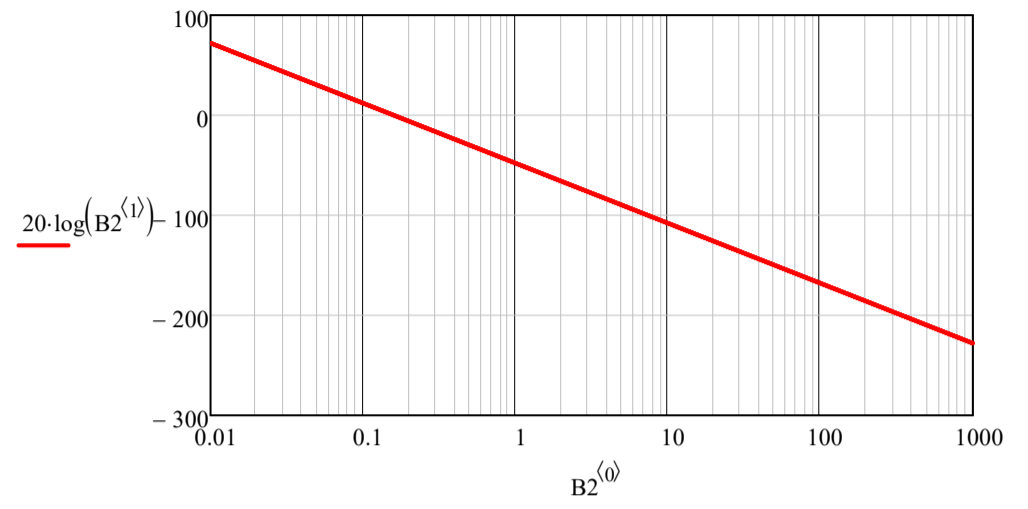
Magnitude Plot (dB)



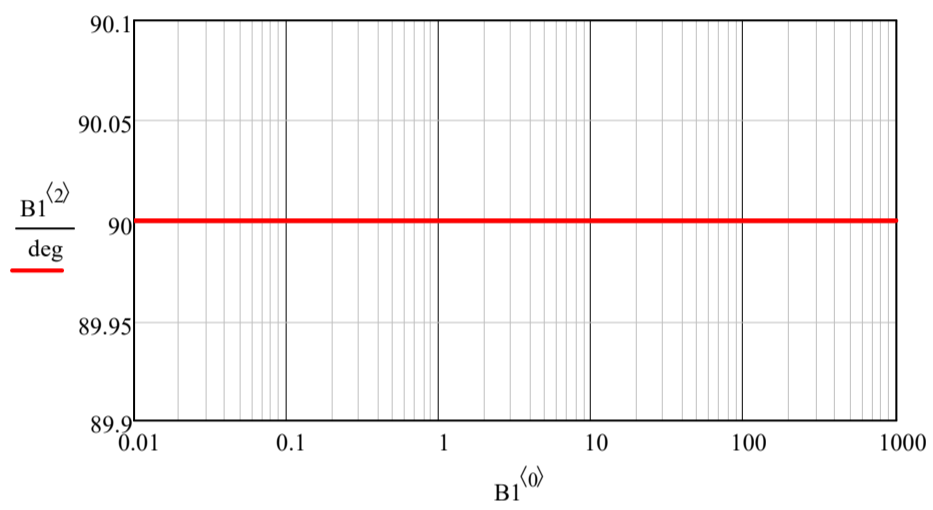
$$H2(s) := \left(\frac{1}{s} \frac{1}{s} \frac{1}{s}\right)^T$$

$$B2 := \text{bode}(H2, 0.01, 10^3, 5000, 0)$$

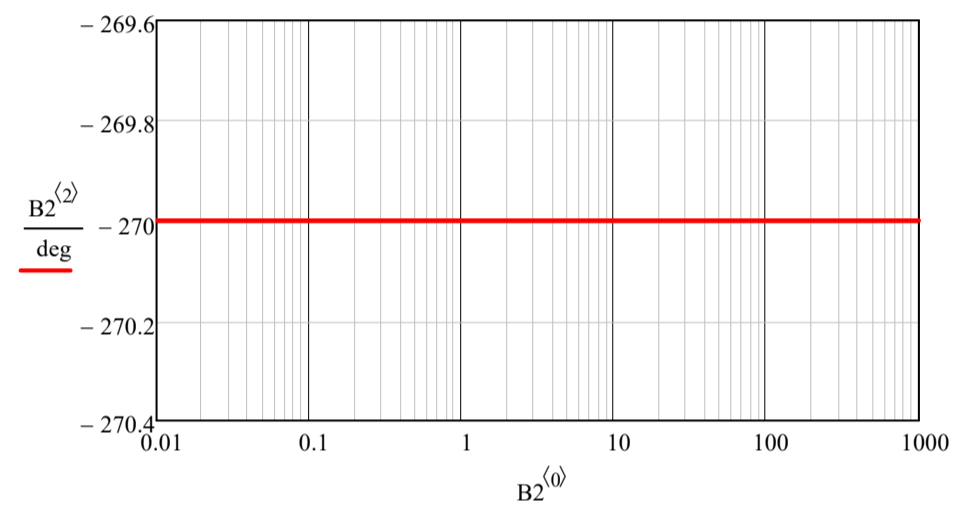
Magnitude Plot (dB)



Phase Plot

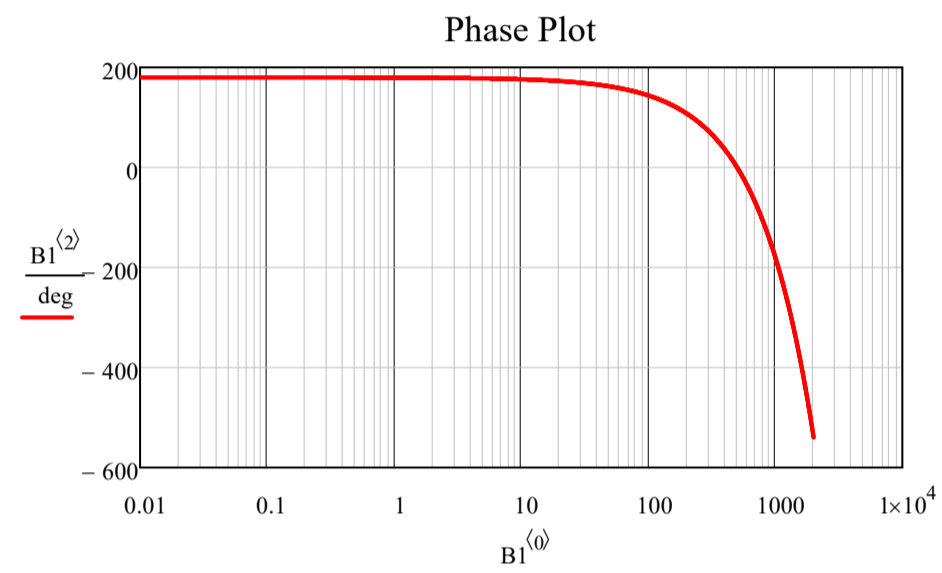
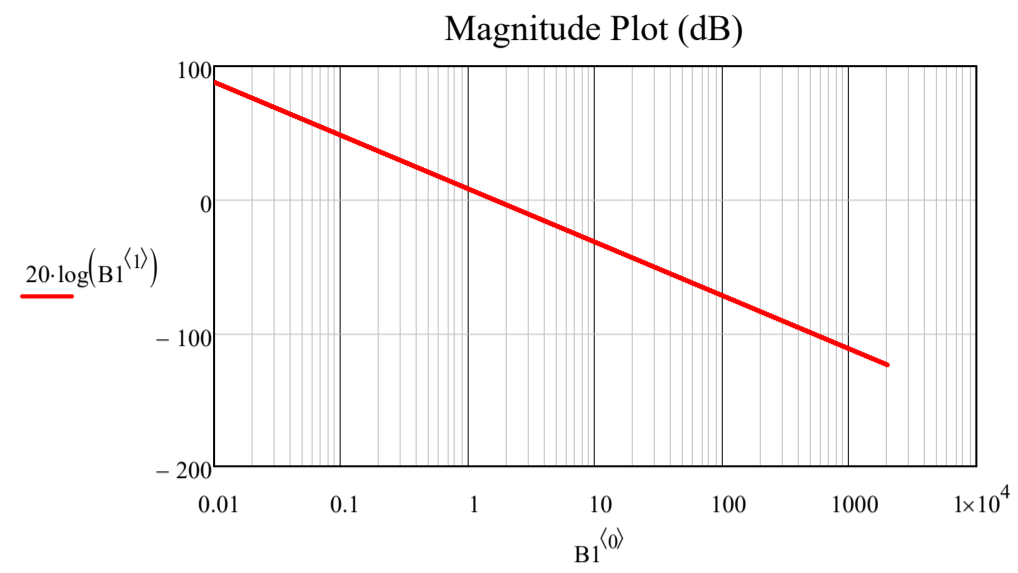


Phase Plot



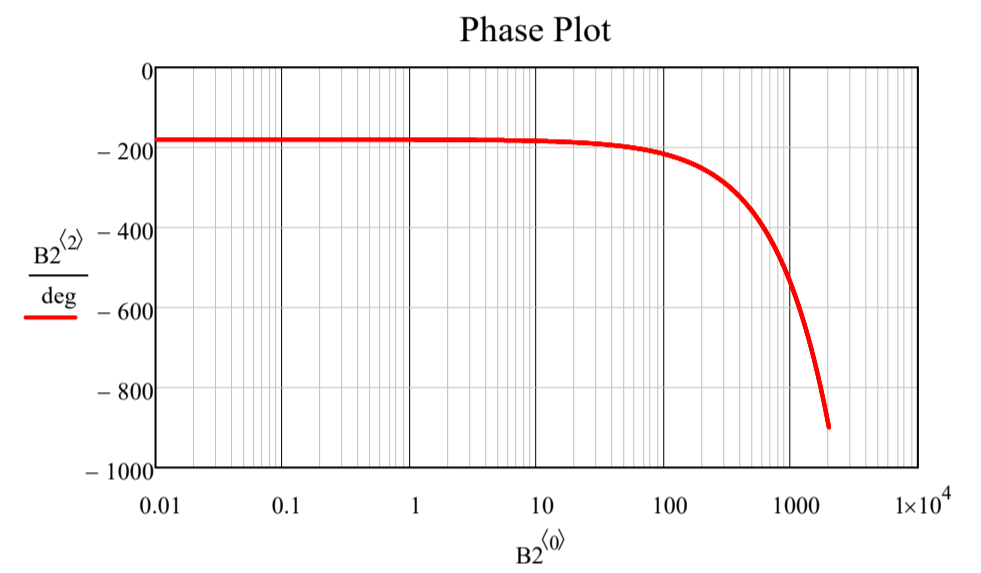
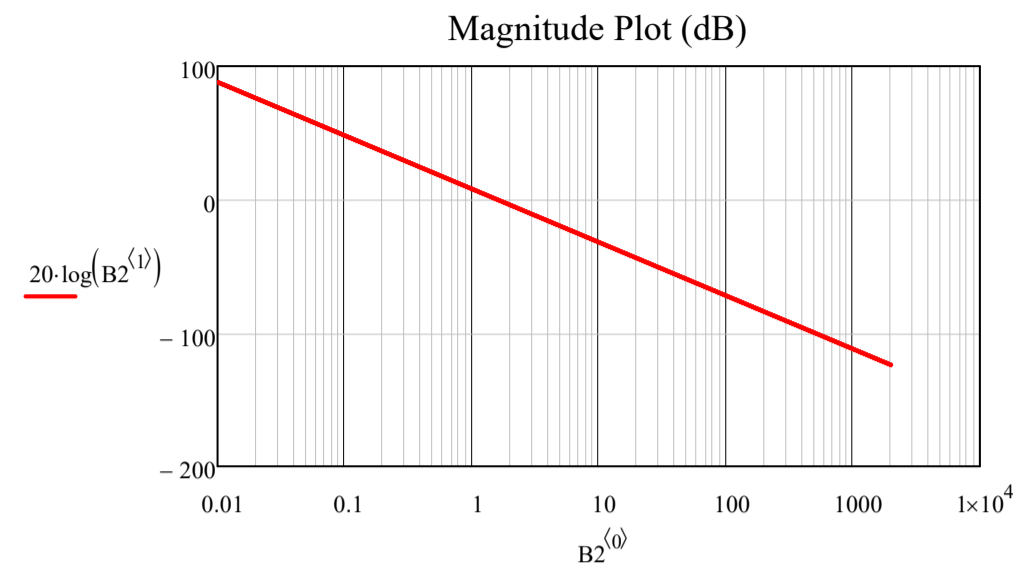
$$H1(s) := \left(\frac{10}{s}\right)^2 \cdot e^{-0.001s}$$

$$B1 := \text{bode}(H1, 0.01, 2 \cdot 10^3, 5000, 1)$$



$$H2(s) := \left(\frac{10}{s} \frac{10}{s} e^{-0.001s}\right)^T$$

$$B2 := \text{bode}(H2, 0.01, 2 \cdot 10^3, 5000, 1)$$



$$B1 := \text{bode}(H1, 0.01, 2 \cdot 10^3, 5000, 0) \quad \text{without phasecor}$$

