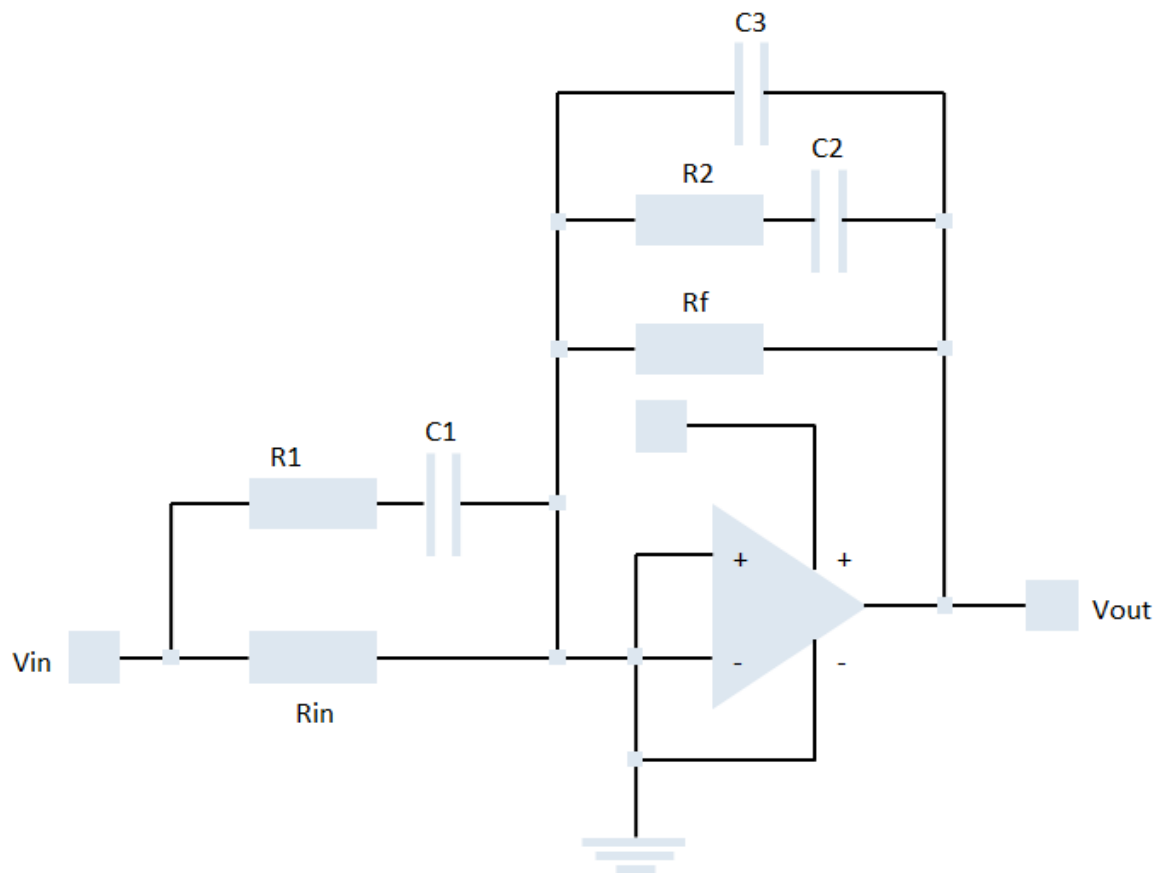


Gain of a Non-Ideal Amplifier

▼ Introduction

In this application, we will plot the gain of this amplifier circuit.



```
> restart:
with(DynamicSystems):
with(plots):
with(Syrup):
```

▼ Analysis

```
> ckt := "
V1 1 0 1
R1 1 2 1000
```

```

C1 2 3 10^(-7)
Rin 1 3 1000
Xamp 0 3 5 OpAmp
Rf 3 5 10^102
R2 3 4 1000
C2 4 5 4.70*10^(-7)
C3 3 5 4.7*10^(-8)
* Create a two-pole op-amp model
* using the provided one-pole model
.subckt OpAmp p n o
.include Library:-NonIdealOpAmp
X1 p n 1 NonIdealOpAmp (A=1, f0=LPF)
X2 1 0 2 NonIdealOpAmp (A=1, f0=GBP)
E1 o 0 2 0 GBP/LPF
.ends OpAmp
.end":

```

▼ Parameters

```

> eqsnum := Solve(ckt, ac):
Solve: There may be an unconnected component.
The following component(s) have zero current: {\`Eout[X1.Xamp]
\`, \`Eout[X2.Xamp]\`, \`Rout[X1.Xamp]\`, \`Rout[X2.Xamp]\`}.

```

```

> gainnum := eval(eval(v[5], eqsnum), {LPF=300, GBP=10^6}):
sys := TransferFunction(gainnum):
evalf(sys:-tf)

```

$$\left[\left(-3.71 \times 10^{114} s^2 - 26.45 \times 10^{117} s - 39.48 \times 10^{120} \right) / \left(2.21 \times 10^{96} s^5 + 14.05 \times 10^{102} s^4 + 88.29 \times 10^{108} s^3 + 2.92 \times 10^{114} s^2 + 20.43 \times 10^{117} s + 11.84 \times 10^{117} \right) \right] \quad (2.1)$$

$$\left[\left(-3.71 \times 10^{114} s^2 - 26.45 \times 10^{117} s - 39.48 \times 10^{120} \right) / \left(2.21 \times 10^{96} s^5 + 14.05 \times 10^{102} s^4 + 88.29 \times 10^{108} s^3 + 2.92 \times 10^{114} s^2 + 20.43 \times 10^{117} s + 11.84 \times 10^{117} \right) \right] \quad (2.2)$$

```

> PhasePlot(sys, hertz = true, range = 10..10^5, size = [800,
400]);

```

