

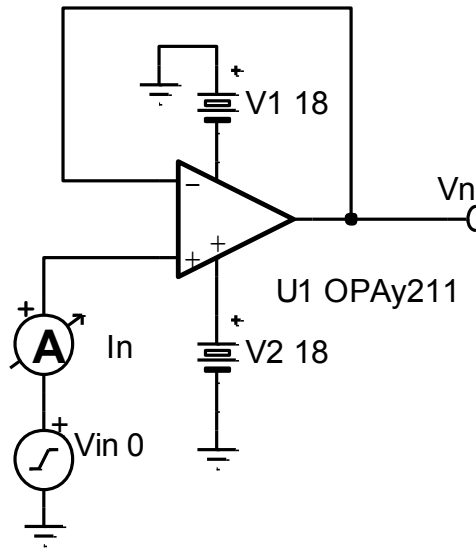
Noise 6

Exercises

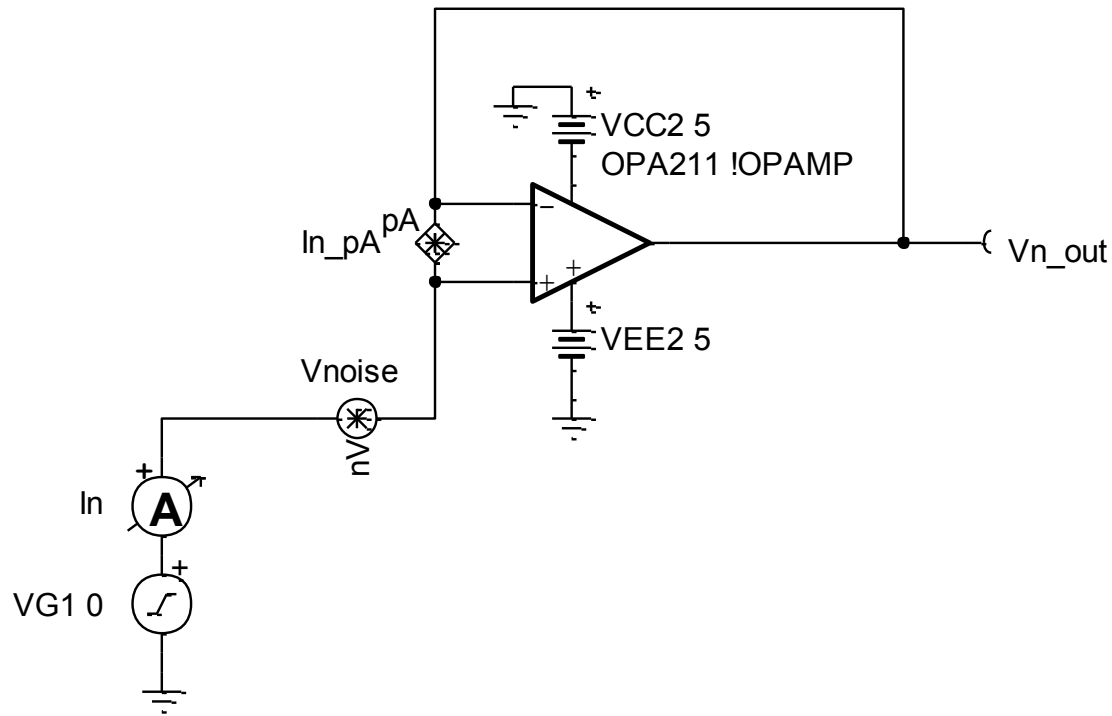
TI Precision Labs – Op Amps



1. Use simulation to generate the data sheet noise curves for OPA211. Does the simulation model match the data sheet?.



2. Create a model for OPA211 noise using the noise current and voltage sources with the generic op amp model.



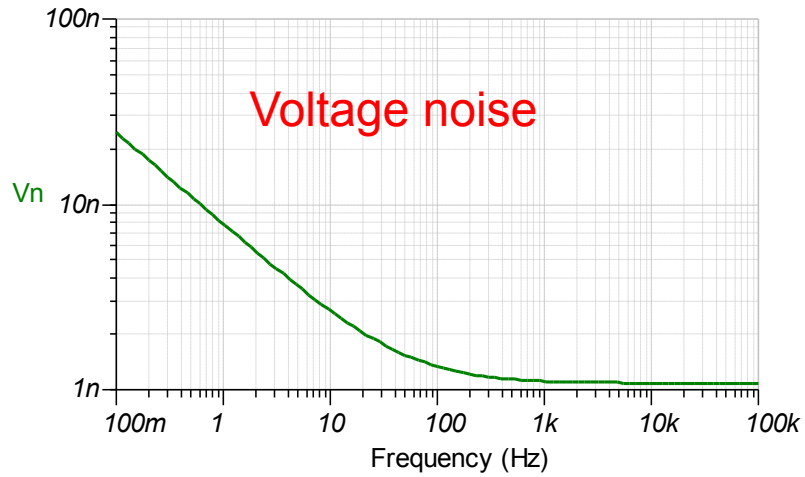
Noise 6

Solutions

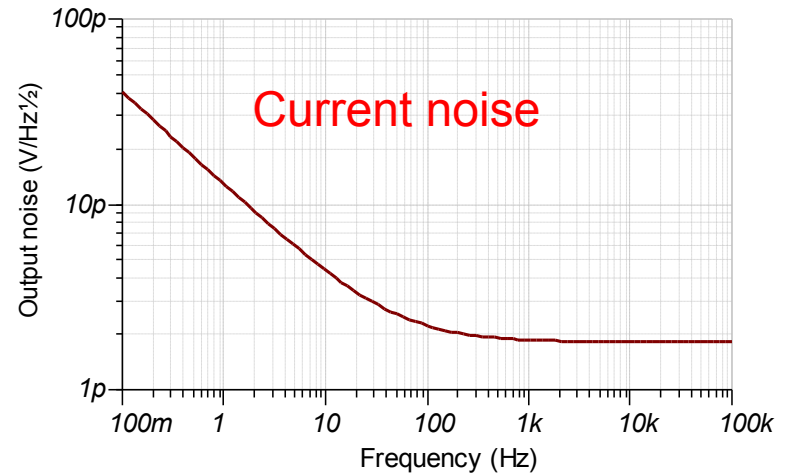
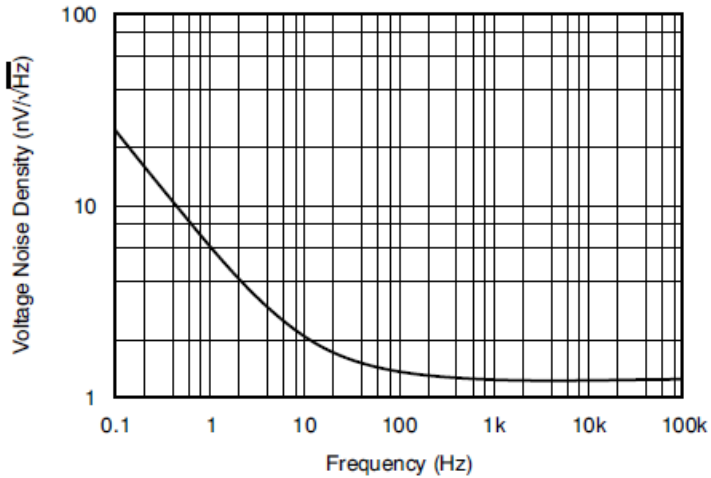
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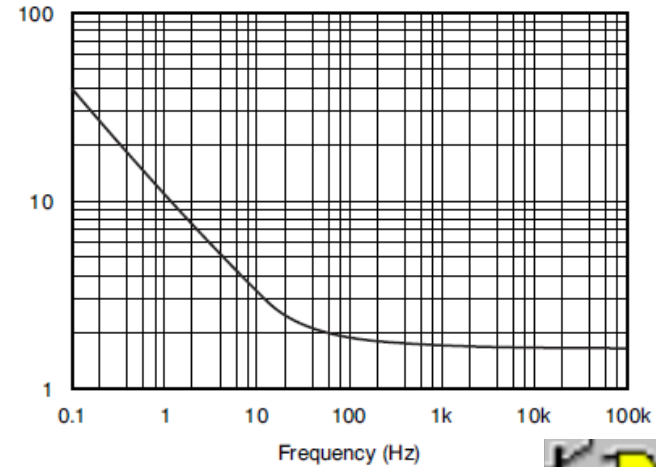
1. Use simulation to generate the data sheet noise curves for OPA211. Does the simulation model match the data sheet?



INPUT VOLTAGE NOISE DENSITY vs FREQUENCY

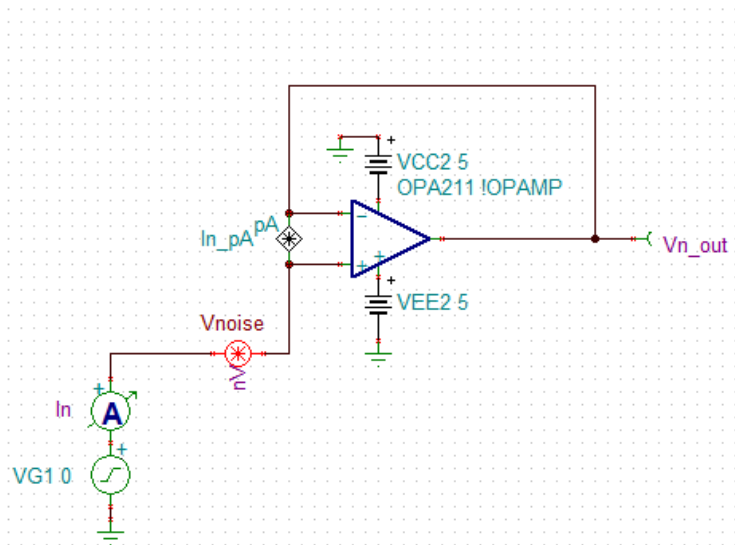


INPUT CURRENT NOISE DENSITY vs FREQUENCY



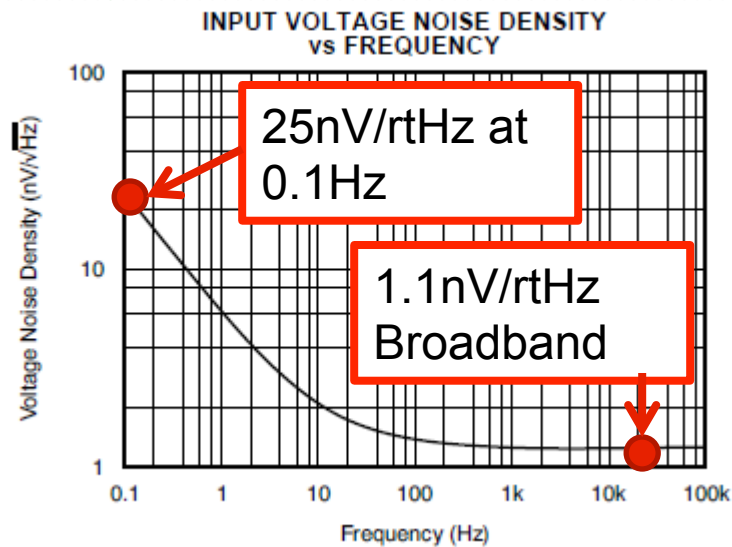
1316 - Noise 6 - Problem 1.TSC

2. Create a model for OPA211 noise using the noise current and voltage sources with the generic op amp model. **Set Voltage noise source.**

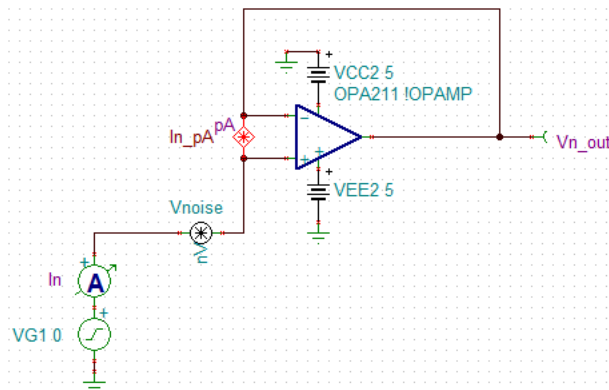


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.SUBCKT VNSE 1 2
* BEGIN SETUP OF NOISE GEN - NANOVOLT/RT-HZ
* INPUT THREE VARIABLES
* SET UP VNSE 1/F
* NV/RHZ AT 1/F FREQ
.PARAM NLF=25
* FREQ FOR 1/F VAL
.PARAM FLW=0.1
* SET UP VNSE FB
* NV/RHZ FLATBAND
.PARAM NVR=1.1
* END USER INPUT
* START CALC VALS
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.MODEL DVN D KF={PWR(FLW,0.5)/1E11} IS=1.0E-16
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I2 0 8 10E-3
D1 7 0 DVN
    
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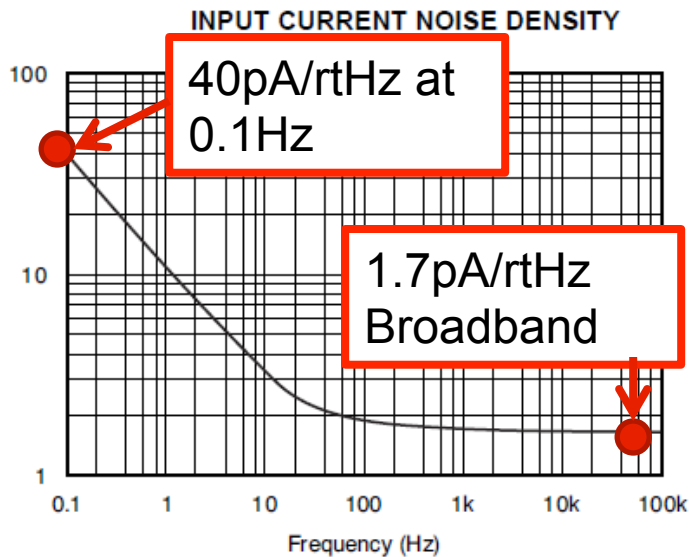


2. Create a model for OPA211 noise using the noise current and voltage sources with the generic op amp model. **Set current noise source.**



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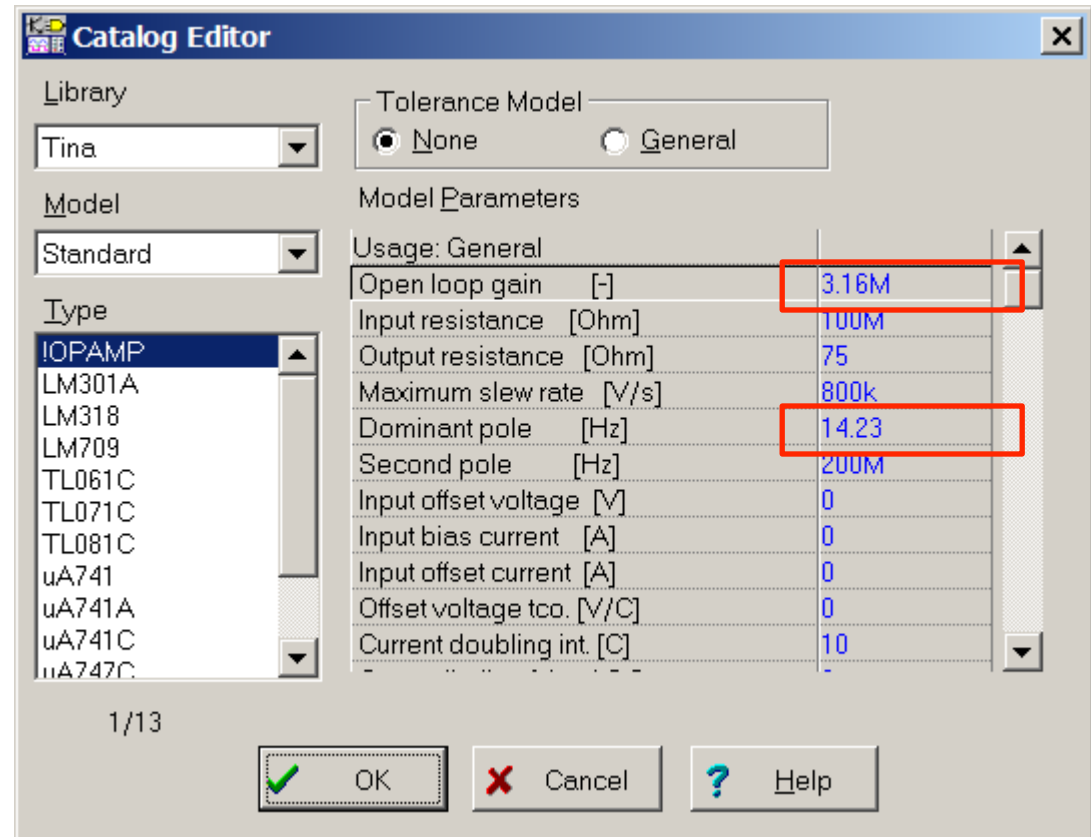
Netlist Viewer
File Edit Analysis Help
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.SUBCKT PICO 1 2
* BEGIN SETUP OF NOISE GEN - PICO0AMPS/RT-HZ
* INPUT THREE VARIABLES
* SET UP INSE 1/F
* PA/RHZ AT 1/F FREQ
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* FREQ FOR 1/F VAL
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* PA/RHZ FLATBAND
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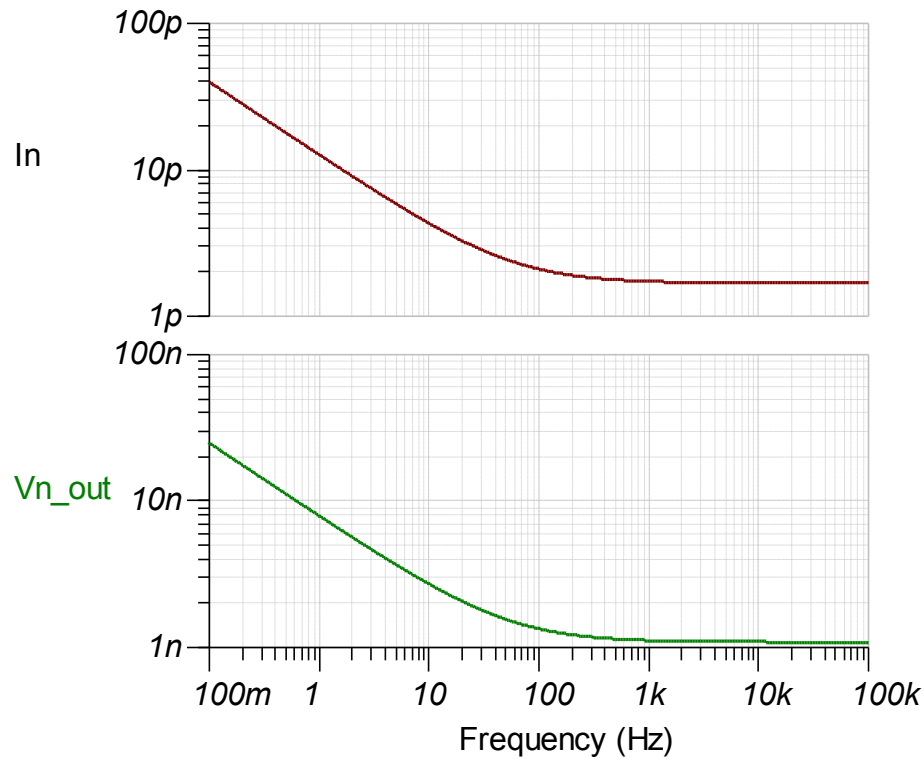
2. Create a model for OPA211 noise using the noise current and voltage sources with the generic op amp model. **Set up op amp.**

$$A_{OL} = 10^{\frac{130}{20}} = 3.162 \times 10^6 \text{ V/V}$$

$$\text{Dom_Pole} = \frac{45 \cdot 10^6}{10^{\frac{130}{20}}} = 14.23 \text{ Hz}$$



2. Create a model for OPA211 noise using the noise current and voltage sources with the generic op amp model. **Test new circuit.**



1316 - Noise 6 – Problem 2.TSC

