OP-AMP Bandwidth Considerations.

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Input $V_i = 10$ mv peak, $A_v = -500$, $V_o = 5.0$ volts peak or 10 vpp.
Input $V_r = 9.98$ mv DC, $A_v = 501$, $V_o = 5.0$ volts DC Level.
Input $V_i$ frequency is 100 Hertz.
Unity Gain Bandwidth = 1 Mhz.
Input $V_i = 10 \text{ mv peak}$, $A_v = -500$, $V_o = 4.65$ volts peak or 9.3 vpp.
Input $V_r = 9.98 \text{ mv DC}$, $A_v = 501$, $V_o = 5.0$ volts DC Level.
Input $V_i$ frequency is 1K Hertz. Unity Gain Bandwidth = 1 Mhz.
$V_o$ is no longer 5.0 v peak because of Bandwidth Limitations.
Dual Supply Multi-Input OP-Amp

Input \( V_i \) = 10 mv peak, \( A_v = -500 \), \( V_o = 4.15 \) volts peak or 8.3 vpp.
Input \( V_r \) = 9.98 mv DC, \( A_v = 501 \), \( V_o = 5.0 \) volts DC Level.
Input \( V_i \) frequency is 2K Hertz. Unity Gain Bandwidth = 1 Mhz.
\( V_o \) is no longer 5.0 v peak because of Bandwidth Limitations.
Notice the Output Amplitude Decreasing with Increasing Frequency.
Input $V_i = 10$ mv peak, $Av = -500$, $V_o = 0.9$ volts peak or 1.8 vpp.
Input $V_r = 9.98$ mv DC, $Av = 501$, $V_o = 5.0$ volts DC Level.
Input $V_i$ frequency is 2K Hertz. Unity Gain Bandwidth = 1 Mhz.
$V_o$ is no longer 5.0 v peak because of Bandwidth Limitations.
Notice the Output Amplitude Decreasing with Increasing Frequency.