Gain Calculations

Friday, December 2, 2022 1:13 PM

A_V (voltage gain) = Vout / Vin , % error = $\left| \frac{\text{observed val} - \text{actual val}}{\text{actual val}} \right| \times 100$

CE:

$A_V(\text{experimental}) = \frac{2.09\ V}{0.200\ V} = 10.45$

$A_V(\text{simulated}) = \frac{2.02V}{0.200V} = 10.1$

$A_V(\text{theoretical}) = 11$

- % error (theoretical vs exp): $\left| \frac{10.45 - 11}{11} \right| \times 100 = 5\%$
  → within reasonable bounds
- % error (theoretical vs simulated): $\left| \frac{10.1 - 11}{11} \right| \times 100 = 8\%$
  → not within the 5% bound

CC

$A_V(\text{exp}) = \frac{0.215V}{0.200V} = 1.075$

$A_V(\text{sim}) = \frac{0.197V}{0.200V} = 0.985$

$A_V(\text{theo}) = 1$

% error (theo - exp): $\left| \frac{1.075 - 1}{1} \right| \times 100 = 7.5\%$

% error (theo - sim): $\left| \frac{0.985 - 1}{1} \right| \times 100 = 1.5\%$

Coupled:

$A_V(\text{exp}) = \frac{2.11V}{0.200V} = 10.55$

$A_V(\text{sim}) = \frac{2.40V}{0.200V} = 12$

$A_V(\text{theo}) = 11$

% error (theo - exp) = $\left| \frac{10.55 - 11}{11} \right| \times 100 = 4\%$

% error (theo - sim) = $\left| \frac{12 - 11}{11} \right| \times 100 = 9\%$