

ELL315 - Advanced Analog Integrated Circuits - Minor 1

Indian Institute of Technology Delhi

Time: 1 hour; Total marks: 20

Instructions

- Read the questions carefully. If the question is wrong state what is wrong and if any circuit parameter or device state is not mentioned, assume as per your convenience. Don't ask for any clarification, there is nothing to clarify!!
- Be concise, write no more than couple of sentences for every question.

Q1. (a) Show the reciprocal network of an inverting amplifier and determine the gain using the reciprocal network. (3 marks)

(b) In the circuit shown in figure 1(a) and (b) prove that if Z_0 is 0 then the noise associated with R_L has no contribution to the input referred noise. (3 marks)

(c) In the circuit shown in figure 2, determine the total input referred noise. (3 marks)

(d) Suggest some methods to reduce the noise of the differential pair shown in figure 3. (2 marks)

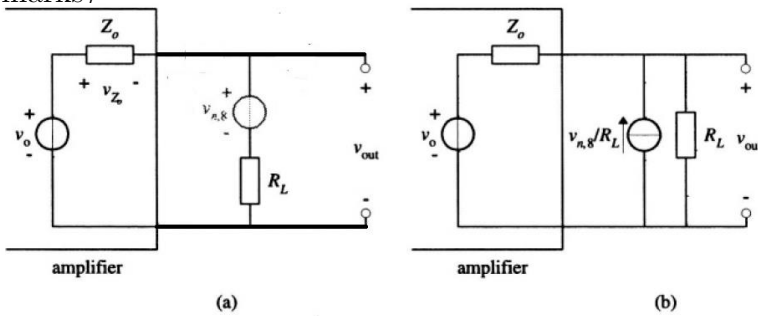


Figure 1:

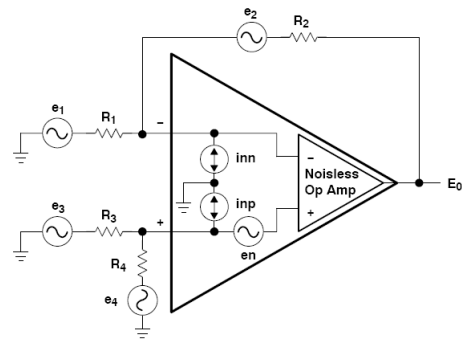


Figure 2:

Q2. (a) Draw the adjoint network of the circuit shown in figure 4 with switches replaced with on-resistance values and use it to determine the output referred noise. (3 marks)

(b) Explain why a common source amplifier is the best choice compared to common gate or common drain stage for 1st stage nullor in the operational amplifier design. (3 marks)

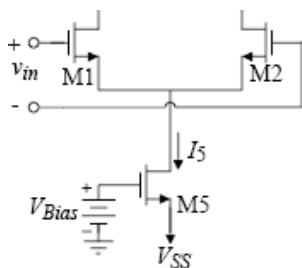


Figure 3:

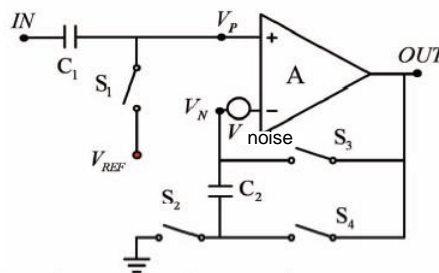


Figure 4:

Q3. (a) Frame your own question worth 3 marks, justify why it should be graded for 3 marks and write the answer. Direct example questions from any textbook will not be evaluated. Numerical and direct class note stuff will not get you good marks. (3 marks)