

Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science

6.002 – Electronic Circuits
Fall 2000

Final Exam

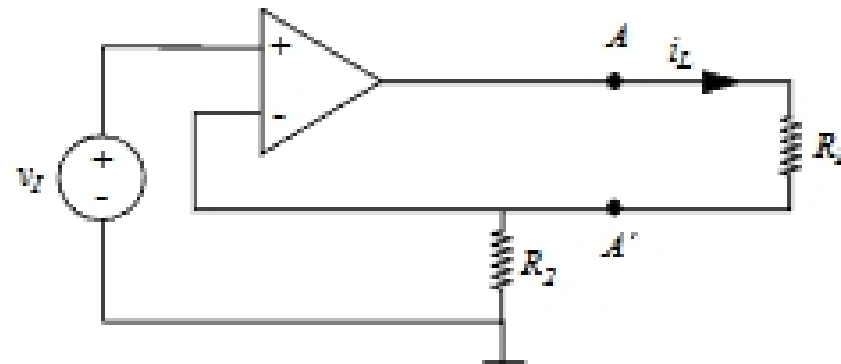
- Please write your name in the space provided below, and circle the name of your recitation instructor and the time of your recitation.
- Please verify that there are 19 pages in your exam.
- To the extent possible, do all of your work on the pages contained within this exam. In particular, try to do your work for each question within the boundaries of the question, or on the back side of the page preceding the question.
- You may use three double-sided pages of notes while taking this exam.
- Final grades in 6.002 will not be given out by phone or by e-mail. Rather, they should be available through WEBSIS by December 22. You may review and take back your final exam at the beginning of IAP in January 2001 from Room NE43-624.
- Good luck!

Problem	Score
1	
2	
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Total	

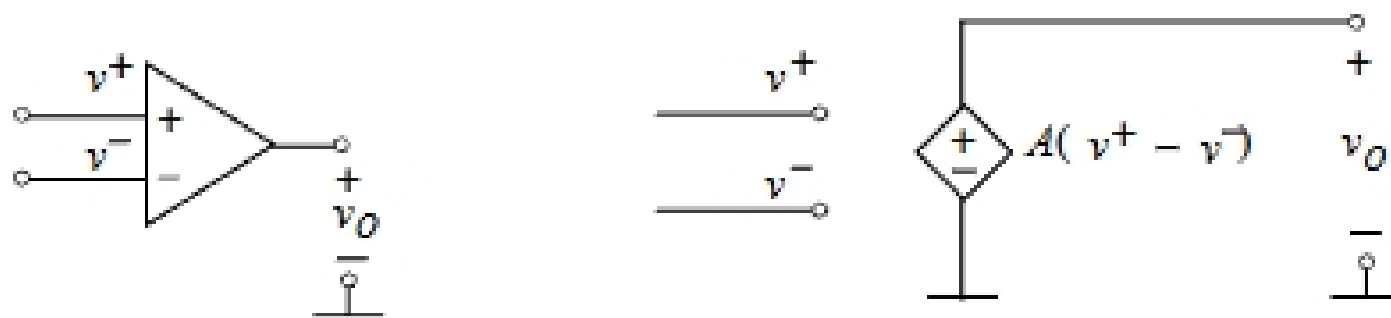
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Problem 1 – 15 Points

The Op-Amp circuit shown below is very similar to the standard non-inverting Op Amp except that R_L is some external resistor, and we are interested in showing that the current through R_L is nearly constant, regardless of the value of R_L , that is, the circuit acts like a *current source* for driving R_L .



(A) Using the Op-Amp model shown below, derive an expression for i_L in terms of v_I , A , R_2 and R_L . Show that this expression for i_L becomes independent of R_L as A approaches infinity.



(B) To verify the “current source” action more directly, use the Op-Amp model from Part **A** to find the Thévenin equivalent resistance looking to the left of terminals AA' .