Homework 11: Operational Amplifiers

Introduction

The problems for this assignment focus on operational amplifiers and on using Laplace transforms with them.

Problems

Connect

(1) **A&S 5.5**. This problem is meant to show you how good the ideal op amp assumptions and the assertions are.

(2) **A&S 5.24**. There will be two equations with two unknowns here.

(3) **A&S 5.32**. Remember that the op amp output voltage is not impacted by what happens downstream - find that voltage first and then figure out what that means for the current.

(4) **A&S 5.59**.

(5) **A&S 5.71**. You will want to solve this "modularly" - that is, get the output for the left-most op amps first, then use those results to get the total.

(6) **A&S 14.60**.

(7) **A&S 14.63**. Section 14.8 is helpful here.

(8) **A&S 14.64**.

(9) **A&S 14.67**. Section 14.8 is helpful here. Also, Hz≠rad/s.

(10) **A&S 16.100**.

(11) **A&S 16.101**. Note that the element types are given to you (elements 1 and 3 are capacitors and element 2 is a resistor; the admittance $\mathbb{Y}$ is given primarily because the feedback path has elements in parallel and you can add parallel admittances).

Sakai

None for this assignment.

Comments

(1) For most of these op amp problems, you could use the basic configurations in class. Note that is not always the case - for example, Problems 5.60 and 5.62 (among many others that you are not doing) have structures that do not neatly fit into a combination of inverting / non-inverting / summation / difference amplifiers.

(2) On the other hand, sometimes complicated circuits can be decomposed into modular parts. Problem 5.66, for example, is a combination of an inverting amplifier (the middle part of the circuit) and a summation amplifier with three source / resistor combinations.