MASSACHVSETTS INSTITVTE OF TECHNOLOGY
Department of Electrical Engineering and Computer Science
6.01—Introduction to EECS I
Spring Semester, 2008

NanoQuiz Week #5 (sections 1 and 2)

Name: _____ **Athena userid:** _____@mit.edu

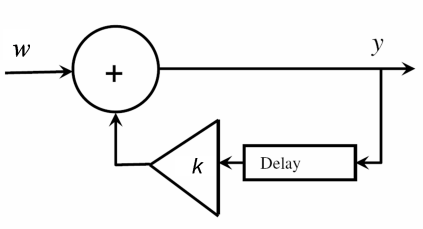
This quiz is due promptly 15 minutes after the start of the lab period.

You may use the weekly assignment handout, but the quiz is otherwise closed book and closed computer.

Let H_1 be the LTI system with input x and output w described by

$$w[n] = 0.5w[n-1] + x[n]$$

and let H_2 be the LTI system with input w and output y described by the following block diagram, where k is some constant (positive or negative):



Let H_3 be the system formed by cascading H_2 after H_1, with input x and output y.

1. What is the system function for H_1 and what are its poles?

2. What is the system function for H_2 and what are its poles?

3. What is the system function for H_3 and what are its poles?

Additional questions on the reverse side...

4. For which values of k is the cascaded system H_3 unstable (i.e., the output grows arbitrarily large)?

5. Give a single difference equation that describes H_3 and directly relates y to x.