

EECS 216 – Winter 2008

Homework #9–Assigned March 25–Due Tuesday April 1

- **Grading:** Not all problems will be graded, but you should do all of them.
 - **Submission:** Due in *black box in room 4230 EECS* before **5:00** on Tues. April 1.
 - **Read:** Text sections 5.1-5.6. **Topic:** Laplace transforms and properties.
 - **Next week:** Applications of Laplace: Transfer functions and s-plane circuits.
1. (20 points: 4@5) Text #5.11bcgj. Inverse Laplace transforms and partial fractions. Compare (j) with (b). Use $\mathcal{L}\{\cos(at)u(t)\} = \frac{s}{s^2+a^2}$.
 2. (20 points: 4@5) Text #5.12abdf. Convolutions using Laplace. Isn't this easier?
 3. (25 points: 5+10+10) Text #5.20bde. Differential equations using Laplace transforms.
 - **5.20d:** Initial conditions are: $y(0)=2$ and $y'(0)=1$
 - Compute the ZIR (Zero-Input) and ZSR (Zero-State) responses separately.
 - The complete solution is then ZIR+ZSR. OR: Identify ZIR and ZSR.
 4. (15 points: 5+10) Text #5.21bc. Impulse responses using Laplace transforms. Note what happens in (c). Is this realistic? Why?
 5. (20 points) Solve the simultaneous differential equations

$$\begin{aligned}\frac{dx}{dt} + 3x(t) + 8y(t) &= 0 & x(0) &= 1 \\ \frac{dy}{dt} + 3y(t) - 2x(t) &= 0 & y(0) &= 2\end{aligned}$$