

EXTRA CREDIT HOMEWORK 2, COURSE 267, FALL 2004

Problem 1. Consider the initial value problem

$$y'' + y = H(t - 3)\cos(t), y(0) = y'(0) = 0.$$

A) $y(1) = \frac{1}{2}$. **B)** $y(1) = -\frac{1}{2}$. **C)** $y(1) = 3e$. **D)** $y(1) = -\frac{1}{e}$. **E)** $y(1) = 0$. **F)** None of above

Problem 2. Consider the initial value problem

$$y'' - 3y' + 2y = e^t\delta(t - \pi), y(0) = y'(0) = 0.$$

A) $y(1) = \frac{3}{4}$. **B)** $y(1) = 5$. **C)** $y(1) = -5e$. **D)** $y(1) = e + \cos(1)$. **E)** $y(1) = 0$. **F)** None of above.

Problem 3. Consider the initial value problem

$$y'' + y' + 2y = \delta(t - 4) + tH(t - 4), y(0) = y'(0) = 0.$$

A) $y(1) = 0$. **B)** $y(1) = 0.2$ **C)** $y(1) = -3$. **D)** $y(1) = \frac{1}{\sqrt{2}}\cos(1)$. **E)** $y(1) = -\frac{1}{2}$. **F)** None of above.

Problem 4. Consider the function

$$F(s) = \frac{2(s - 1)e^{-2s}}{(s^2 - 2s + 2)}.$$

Let $f(t)$ be an inverse transform of the function $F(s)$. Then

A) $f(1) = e^{-1}\cos(1)$. **B)** $f(1) = 0$ **C)** $f(1) = \frac{33}{51}$. **D)** $f(1) = e^{-2}\cos(1)$. **E)** $f(1) = -3e^{-2}\cos(1)$. **F)** None of above.

Problem 5. Consider the function

$$F(s) = \frac{2s + 1}{(4s^2 + 4s + 5)}.$$

Let $f(t)$ be an inverse transform of the function $F(s)$. Then

A) $f(1) = \frac{1}{2}e^{-1}\cos(1)$. **B)** $f(1) = -\frac{1}{2}e^{-1}\cos(1)$ **C)** $f(1) = 2\frac{1}{2}e^{-\frac{1}{2}}\cos(1)$. **D)** $f(1) = -\frac{1}{2}e^{-\frac{1}{2}}\cos(1)$. **E)** $f(1) = 3\frac{1}{2}e^{-\frac{1}{2}}\cos(1)$. **F)** None of above.

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