ENGR 695   Advanced Topics in Engineering Mathematics   Fall 2024

Selected Answers to HW #3

Include explanatory text and intermediate calculations in your solutions. You will not receive credit for merely repeating an answer given here without supporting work.

If an answer is not provided below, it is either because the solution is trivial or because disclosure of the answer would reveal too much of the solution.

It is possible that one or more of the answers given below is incorrect. There is a trade-off between speed and accuracy. The faster that selected answers are posted to the web site, the more likely that a mistake could have been made in the rush to prepare them. You should develop the ability to evaluate the accuracy of any information that you rely on. If you suspect that an answer below is incorrect, please let me know as soon as possible.

1.   [answers not given]

2.   In general, $\sigma_1 = 1$, $\sigma_2 = \varepsilon$, and $U = \begin{bmatrix} \pm 1 & 0 \\ 0 & \pm 1 \end{bmatrix}$

3.   a. $y(x) = \cos(ax) - \cot(4a)\sin(ax)$

b. $y_n(x) = c_2 \sin\left(\dfrac{n\pi x}{4}\right), \quad n = 1, 2, 3, \ldots$

4.   a. $y(x) = \cosh(ax) - \coth(4a)\sinh(ax)$
b. [answer not given]

5. $\lambda < 0$: no nontrivial solutions
$\lambda = 0$: no nontrivial solutions
$\lambda > 0$: $y_n(x) = c_2 \sin(nx), \quad n = 1, 3, 5, \ldots$