Chapter 6 Section 2 & 3

Find the solution to the IVP

$$x''(t) + x(t) = \sin 2t, \qquad x(0) = 2, \qquad x'(0) = 1.$$

Chapter 6 Section 2 & 3

The unit step function is

Sketch the graph of $h(t) = u_\pi(t) - u_{2\pi}(t)$.

Chapter 6 Section 2 & 3

Consider the function:

$$f(t) = \begin{cases} 2 & 0 \leq t < 4 \\ 5 & 4 \leq t < 7 \\ -1 & 7 \leq t < 9 \\ 1 & 9 \leq t \end{cases}.$$

Chapter 6 Section 2 & 3

Find the Laplace transform of $u_c(t)$.

Find the Laplace transform of f above.

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Assume that f is a function whose Laplace transform is defined. If

$$g(t) = \begin{cases} 0 & 0 \leq t < c \\ f(t-c) & c \leq t \end{cases}$$

Note that $g(t) = u_c(t)f(t-c)$. Find $\mathcal{L}\{g\}(s)$.

Chapter 6 Section 2 & 3

Find the inverse Laplace Transform of

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

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A similar computation shows that:

$$e^{ct} f(t) = \mathcal{L}^{-1}\{F(s-c)\}(t).$$

Using this, find the inverse Laplace trans form of:

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

Chapter 6 Section 2 & 3

Find the inverse Laplace trans form of:

$$G(s) = \frac{s}{s^2 - 4s + 5}.$$

Chapter 6 Section 2 & 3

Find the solution to the IVP

$$x'' - 4x' + 5x = 0, \qquad x(0) = 1, \qquad , x'(0) = 4.$$