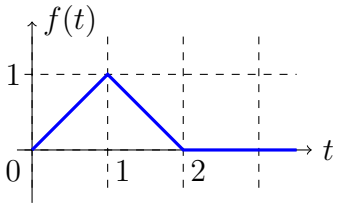
Discontinuous Functions (5.5)

1. Find the Laplace transforms of the following functions.

a. $f(t) = \begin{cases} \sin t, & \pi \le t \le 2\pi, \\ 0, & \text{otherwise.} \end{cases}$

b.



2. Find the inverse Laplace transforms of the following functions.

a. $F(s) = \dfrac{2se^{-\pi s}}{s^2 + 2s + 5}$.

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

Diff eqs with discontinuous forcing functions (5.6)

Solve the following IVPs.

1. $2y' + y = \begin{cases} 2, & 2 \le t \le 4, \\ 0, & \text{otherwise;} \end{cases} \quad y(0) = 1$

2. $y''(t) + y(t) = f(t); \quad y(0) = 1,\ y'(0) = -2, \qquad \text{where } f(t) = \begin{cases} 20\cos(3t), & t < \frac{3}{2}\pi, \\ 0, & t \ge \frac{3}{2}\pi. \end{cases}$