Problem 8.21 Consider a random variable X that is uniformly distributed between the values of 0 and 1 with probability ¼ takes on the value 1 with probability ¼ and is uniformly distributed between values 1 and 2 with probability ½ . Determine the distribution function of the random variable X.

Solution

$$F_X(x) = \begin{cases} 0 & x \leq 0 \\ \dfrac{x}{4} & 0 < x < 1 \\ \dfrac{1}{2} & x = 1 \\ \dfrac{1}{2} + \dfrac{1}{2}(x-1) & 1 < x \leq 2 \\ 1 & x > 2 \end{cases}$$