AI1110
Assignment 7

Sai Pradeep
AI21BTECH11013

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LaTeX

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Example 5.1

Q: Compute the distribution of $ax + b$.

Solution

Let $y = ax + b$

To find $F_y(y)$, we must find the values of x such that $ax + b \leq y$.

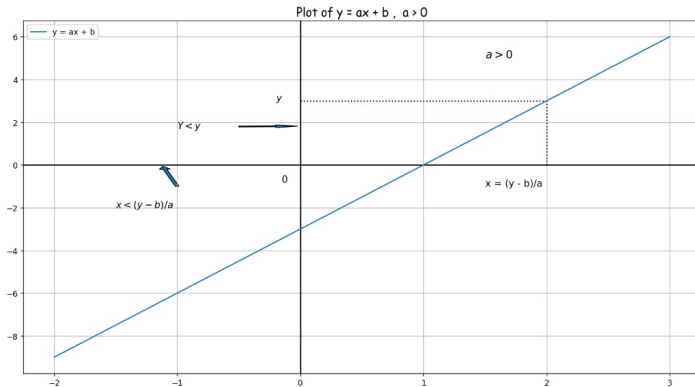1. if $a > 0$, then $ax + b \leq y$ for $x \leq \dfrac{y - b}{a}$. Hence

$$F_y(y) = P(x \leq \frac{y - b}{a}) = F_x(\frac{y - b}{a}), \quad a > 0 \tag{1}$$

2. if $a < 0$, then $ax + b \leq y$ for $x > \dfrac{y - b}{a}$. Hence

$$F_y(y) = P(x \geq \frac{y - b}{a}) = 1 - F_x(\frac{y - b}{a}), \quad a < 0 \tag{2}$$

Output graph

Figure: FIG 1