Assignment 10

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Git Hub Link : https://github.com/ParvezAlam123/Assignment-10

1 Gate 21 :

Consider two identically distributed zero mean random variables U and V. Let the cumulative distribution function of U and 2V be F(x) and G(x) respectively. Then for all value of x
(a) F(x)-G(x)≤0 (b) (F(x)-G(x))x≤0
(c) F(x)-G(x)≥0 (d) (F(x)-G(x))x≥0
Solution:
Let X be a random variable having zero mean. X,U, V have the same distribution.
Since U and V are identically distributed.So

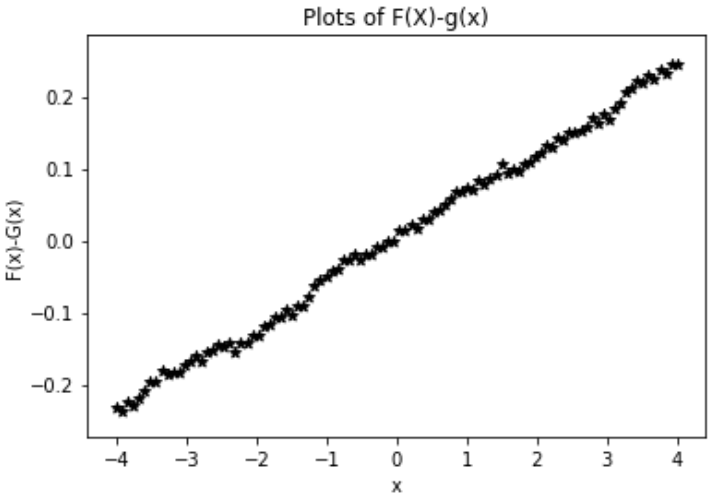
$$\begin{aligned} F(x) &= \Pr(X \le x) \\ G(x) &= \Pr(2X \le x) \\ &= \Pr(X \le x/2) \\ &= F(x) - \Pr(x/2 < X \le x) \end{aligned}$$

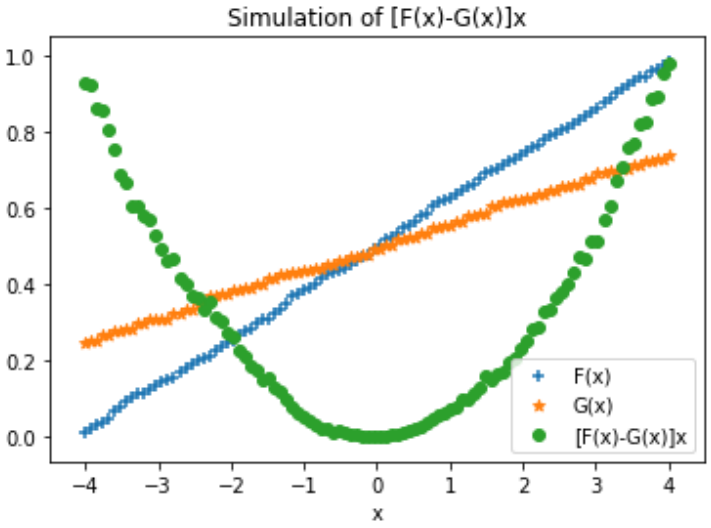
1. if X > 0 then

$$F(x) - G(x) > 0 \tag{1}$$

2. if X < 0 then

$$F(x) - G(x) < 0 \tag{2}$$
$$\Rightarrow (F(x) - G(x))x \ge 0 \tag{3}$$





(a) F(x)-G(x)≤ 0 is wrong because for X> 0, F(x)-G(x)>0 from (1)

(b) (F(x)-G(x))x ≤ 0 is wrong

(c) F(x)-G(x)≥0 is wrong because of (2)

(d) (F(x)-G(x))x≥0 is right from (3)