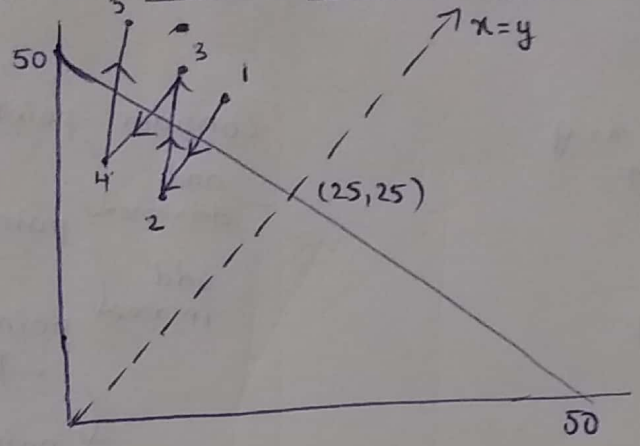
Part - D Fairness

1) Multiplicative Increase Additive Decrease ⟹ Suppose multiplication factor = 1.5
additive decrease factor = 10



Suppose Initial cwnd = (20,40)

Consider point 1 = (20,40) → additive decrease

point 2 = (10,30)

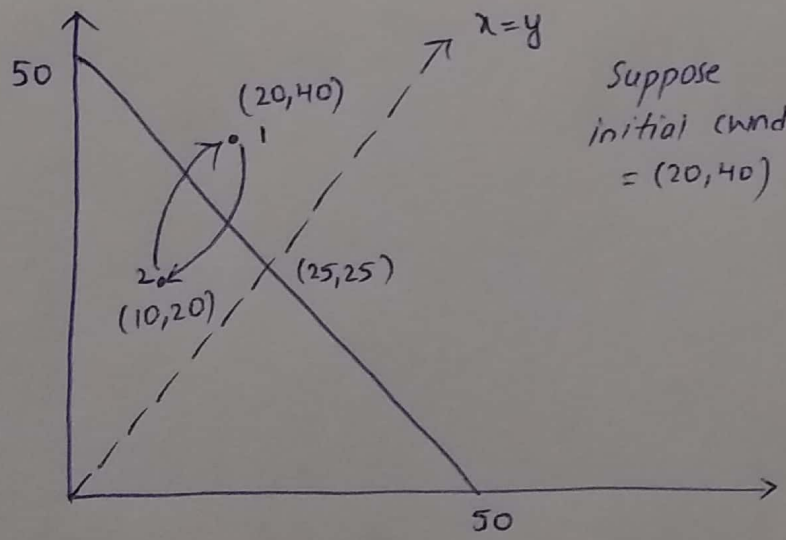
point 3 = (15,45)

point 4 = (5,35)

point 5 = (7.5, 52.5)

As we can see the cwnd never converges to fairness point (25,25) & also it moves away from the fairness line, so this approach is not fair.

2) Multiplicative Increase multiplicative decrease ⇒ Suppose multiplication factor = 2
multiplicative decrease factor = 2



Suppose initial cwnd = (20,40)

Consider Initial cwnd
point 1 = (20,40)

Mul. decrease → point 2 = (10,20)

point 3 = point 1 = (20,40)

point 2 = point 4 = (10,20)

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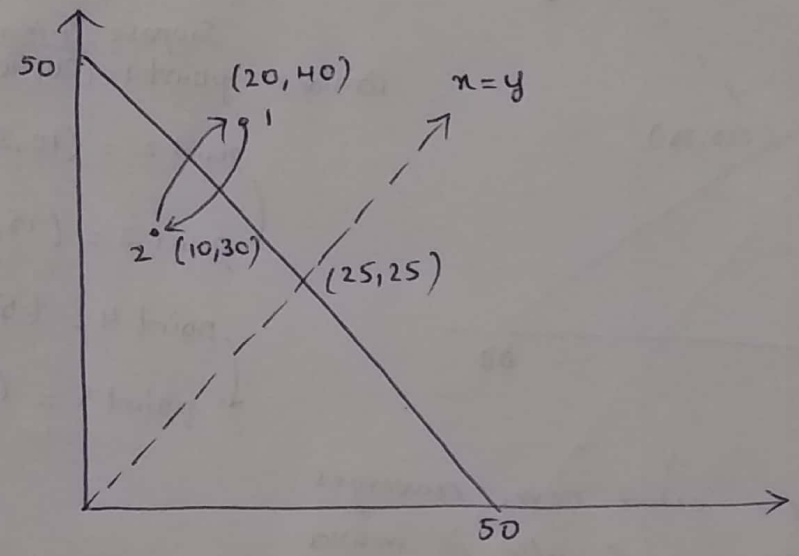
As we can see the cwnd never converges to fairness point (25,25), it always ping pongs between the same two points, so this approach is also not fair.

3) Additive Increase Additive decrease – Suppose addition increase factor = 10

addition decrease factor = 10

Suppose initial cwnd = (20,40)



Initial cwnd

Consider point 1 = (20,40)

add decrease ↓ point 2 = (10,30)

add increase ↓ point 3 = point 1 = (20,40)

↓ point 4 = point 2 = (10,30)

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⋮ ∞

As we can see cwnd never converges to fairness point (25,25), it keeps on ping ponging between (20,40) & (10,30). So this approach is also not fair