

Alternative reason why the CDF is nondecreasing, i.e. increasing.

If $a < b$, want to show $F_X(a) \leq F_X(b)$.

$$F_X(a) = P(X \leq a) \leq P(X \leq a) + \underbrace{P(a < X \leq b)} = P(X \leq b) = F_X(b).$$

copied

in fact this is
larger than or
equal to 0.