ENGG2760A Quiz 6 1155144002 PRINCIPE, Jericho Bibat

PDF : $f_T(t) = \begin{cases} \frac{1}{(t+1)^2}, & \text{if } t \geq 0 \\ 0 & \text{otherwise.} \end{cases}$

~~∴ CDF of T ≤ 5 =~~

∴ CDF of $T \leq 5$: $P(T \leq 5) = \int_{-\infty}^{5} f(t)\,dt$

$= \int_0^5 \frac{1}{(t+1)^2}\,dt$, sub $u = t+1$,

$= \int_1^6 \frac{1}{u^2}\,du$

$= -\frac{1}{u}\Big|_1^6$

$= \frac{5}{6}$

~~CDF of 10 ≤ T~~

~~CDF of $5 > T \geq 10$: $P(5 > T \geq 10) = \int_5^{10} f(t)\,dt$~~

CDF of $T \leq 10$: $P(T \leq 10) = \int_{-\infty}^{10} f(t)\,dt$

$= \int_0^{10} \frac{1}{(t+1)^2}\,dt$, sub $u = t+1$,

$= \int_1^{11} \frac{1}{u^2}\,du$

$= -\frac{1}{u}\Big|_1^{11}$

$= \frac{10}{11}$

∴ $P(5 < T \leq 10) = P(T \leq 10) - P(T \leq 5)$

$= \frac{10}{11} - \frac{5}{6}$

$= \frac{5}{66}$

∴ $P(T \leq 10 \mid T > 5) = \frac{\frac{5}{66}}{1 - \frac{5}{6}}$

$= \frac{\frac{5}{66}}{\frac{1}{6}}$

$= \frac{5}{11}$ 。