Quiz 2

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1. Consider two-tiers of base-stations (BSs): tier 1 and tier 2. The locations of the BSs of tier 1 and tier 2 are modeled as points of independent Poisson point processes Φ_1 and Φ_2. Other parameters are as follows:

Parameter	Tier 1	Tier 2
Locations	Φ_1	Φ_2
Intensity	λ_1	λ_2
Tx-power	P_1	P_2
Path-loss const.	K	K
Path-loss exponent	α_1	α_2

0.5 Mark (a) From the perspective of the typical user, what is the distance distribution to the nearest point of Φ_1 and Φ_2?

2.5 Marks (b) Assuming RSSI based association, what is the probability that the typical user connects to a BS of tier 1?

1 Mark (c) For the special case of $P_1 = P_2 = P$ and $\alpha_1 = \alpha_2 = \alpha$, write the expression of (b) above.

1 Mark (d) Plot the probability derived in step (b) as a function of λ_1. Assume $\lambda_2 = 1e\text{-}5$, $P_1 = 0$ dB, $P_2 = 10$ dB, $K = 1e\text{-}5$

$$\alpha_1 = \alpha_2 = 2.$$

(e) [Bonus - 2 Marks] Verify the above (step (d)) with simulations.