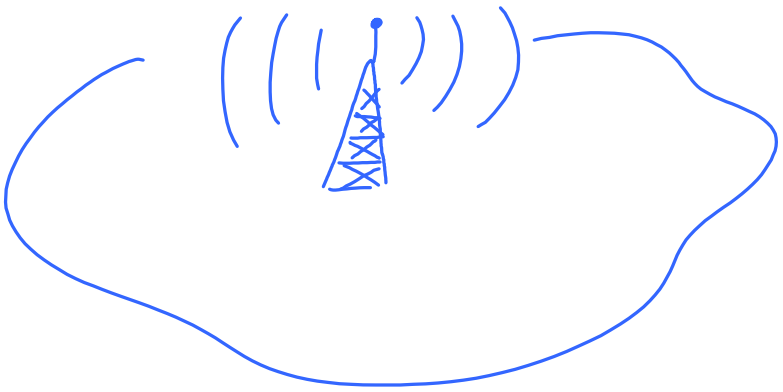
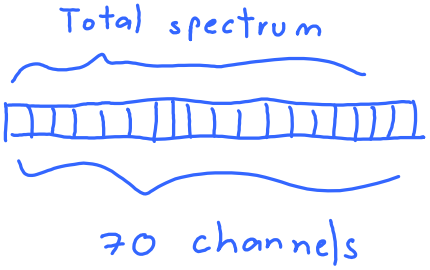
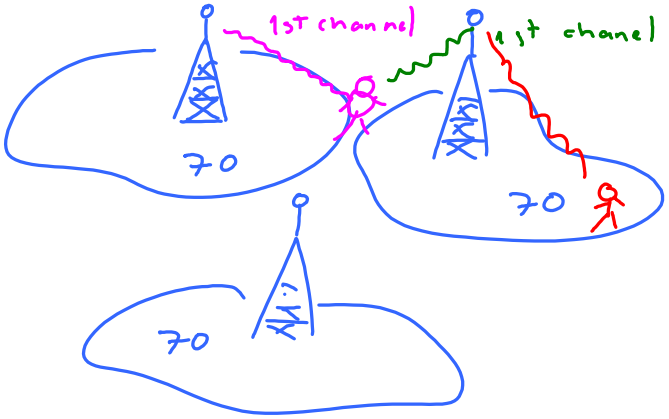
Lecture 4

Monday, November 09, 2009
11:31 PM





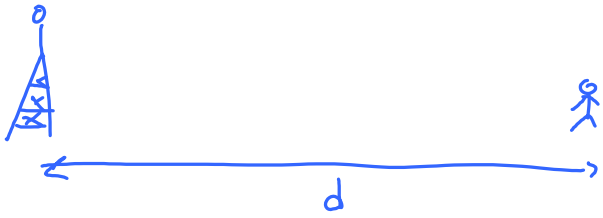


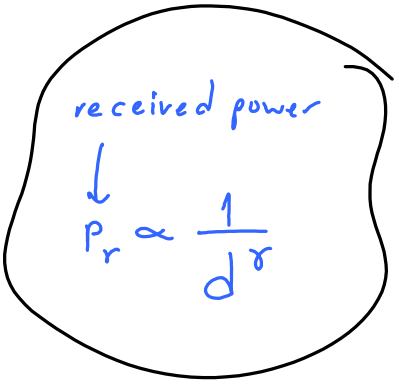
Capacity of overall system

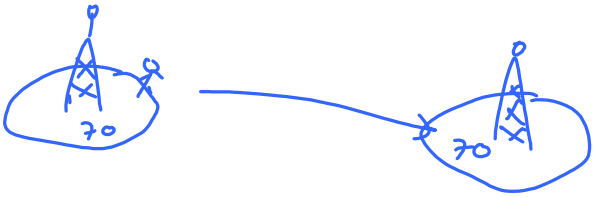
$70 \times 3 = 210$

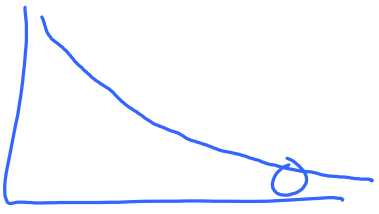
= the # of users the system can support.

Power





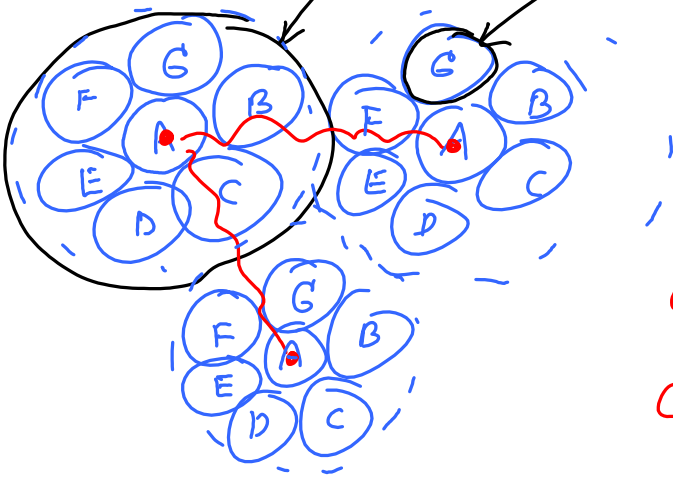




$70 \Rightarrow 7$ groups (each group has 10 channels)

$S \quad N \quad k$

$(S = N \times k)$ 1 cluster, cell



Frequency Reuse

Co-channel

Co-channel Interference.

M = ⁂ of cluster = 3

⁂ users that a cluster can support = $S = N \times k$

⁂ users that the system can support = $S \times M$

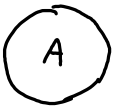
$$C = kNM$$

Capacity

area of each cell

S, A_T, A_c

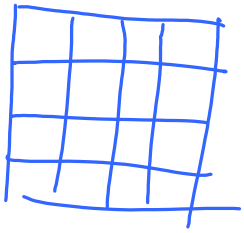
A_T: Total area of the system

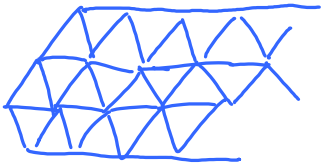


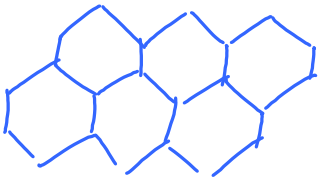
$$M = \frac{A_T}{A_c \times N}$$

$$C = S \times M = S \times \frac{A_T}{A_C} \times \frac{1}{N}$$

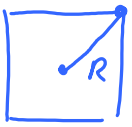
~~Circle~~

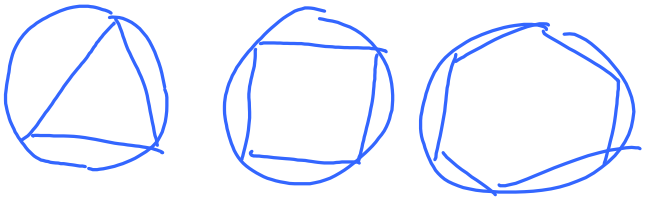






R = worst-case distance





$$\#\text{cells} = \frac{A_T}{A_C}$$

$$N = i^2 + i \times j + j^2 \qquad i, j \text{ integers} \geq 0$$

$i = 1, j = 1$

$N = 1^2 + 1 \times 1 + 1^2 = 3 \leftarrow$

$i = 2, j = 0$

$N = 2^2 + 2 \times 0 + 0^2 = 4 \leftarrow$

$i = 2, j = 1$

$N = 2^2 + 2 \times 1 + 1^2 = 4 + 2 + 1 = 7$