Multi-Antenna Systems

Exercise 1: Would a WiFi system be more likely to use multiple antennas for MIMO or SDMA? How about a cellular system?

WiFi → more in data rate to one user
→ MIMO

cellular → SDMA

Exercise 2: Consider a 2×2 channel where $\mathbf{H}$ is $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $\mathbf{x}$ is $[1, -1]^T$. Find $\mathbf{y}$.

corrected
April 22.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 1-2 \\ 3-4 \end{bmatrix} = \begin{bmatrix} -1 \\ -1 \end{bmatrix}$$

Exercise 3: By (up to) what factor could a MIMO system with 3 transmit and 4 receive antennas increase throughput?

$$\min(3, 4) = 3$$