

Prove $E(X+Y) = E(X) + E(Y)$

$$E(X+Y) = \sum_{\omega \in \Omega} [X(\omega) + Y(\omega)] p_{\Omega}(\omega)$$

$$= \sum_{\omega \in \Omega} X(\omega) p_{\Omega}(\omega) + \sum_{\omega \in \Omega} Y(\omega) p_{\Omega}(\omega)$$

$$= E(X) + E(Y)$$

need some words! next pg.

1st and 3rd equals signs
are definition of expectation

2nd equals sign is
terms of finite sum can
be reordered without
changing the value of the
sum.

$\mathbb{P}^1 \times \mathbb{P}^1 \rightarrow \mathbb{P}^2$ (C)

$\vec{X} = (X_1, X_2)$ is uniform on $\{-1, 0, 1\}^2$

		X_2		
		-1	0	+1
X_1	-1	•	•	•
	0	•	•	•
	+1	•	•	•

Sample space with 9 points

for each of those 9 points
have to determine

$$\vec{v}_1 = (X_1 + X_2, X_1 - X_2)$$

e.g.

$$\vec{X} = (-1, -1)$$
$$\vec{v}_1 = (-2, 0)$$