Mixed strategies

Matching pennies

Player Even \ Player Odd	Heads ↓	Tails ↓
Heads (0.5, p)	1, -1	-1, 1
Tails (0.5, (1-p))	-1, 1	1, -1

$E_{Odd}(Heads) = (1-p) - p = 1-2p$

$E_{Odd}(Tails) = p + -1(1-p) = 2p-1$

Indifference

$E^{fun}_{Odd}(H) = E^{fun}_{Odd}(T)$

$1-2p = 2p-1$

$2 = 4p$

$\frac{2}{4} = p$

$\frac{1}{2}$

Mixed strategy

$p = \frac{1}{2}$ H: 0.5, T: 0.5

Security games

Defender \ Adversary	Terminal 1	Terminal 2
Terminal 1 (3/5, p)	5, -3	-1, 1
Terminal 2 (2/5, (1-p))	-5, 5	2, -1

$E_{Adv}(T1) = 5(1-p) - 3p = 5-8p$

$E_{Adv}(T1) = E_{Adv}(T2)$

$5-8p = 2p-1$

$6 = 10p$

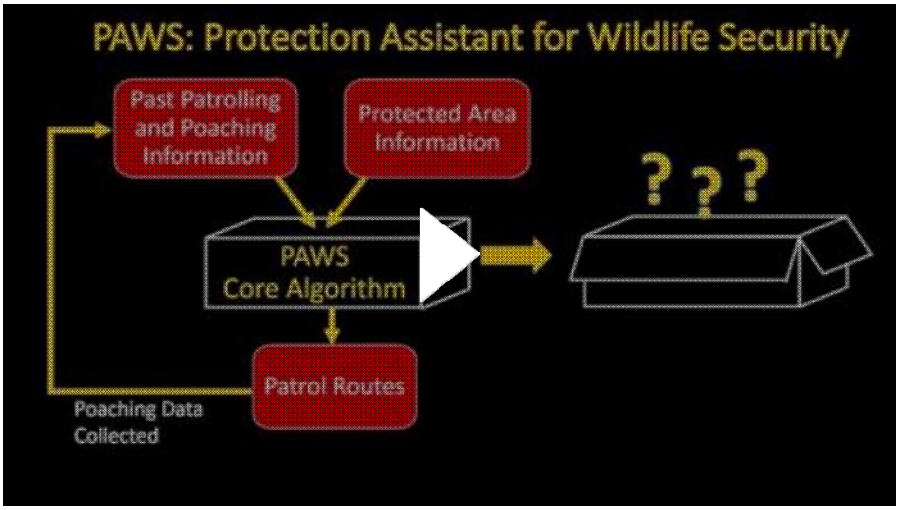
$p = \frac{3}{5}$

$1-p = \frac{2}{5}$

$E_{Max}(T2) = p - 1(1-p) = 2p-1$

[Ferry escort]

[Save the Wildlife, Save the Planet: Protection Assistant for Wildlife Security (PAWS)]



Pure and mixed equilibria

		Player 2 Left (↓ 3/4)	Player 2 Right (1/4)
→ 3/4 p	Player 1 Up	3, 1	0, 0
→ 1/4 (1-p)	Down	0, 0	1, 3

$E_{P_2}(L) = E_{P_2}(R)$

$p = 3 - 3p$

$4p = 3$

$p = 3/4$

$E_{P_2}(L) = p$

$E_{P_2}(R) = 3(1-p)$

Assumptions

		Player Odd Heads	Player Odd Tails
→	Player Even Heads	1, -1	-1, 1
	Player Even Tails	-1, 1	1, -1

1. Rational
2. Self interested
3. Perfect information
4. Pay-offs are known
5. Simultaneous moves