There are three more books on reserve:

 Strategies and Games: Theory and Practice (Dutta) (also available online)

- An Introduction to Game Theory (Osborne) (contains evolutationarily strategic strategies)
- Thinking Strategically (Dixit and Nalebuff)

Find a real world application of the quantitative reasoning that we've covered in class

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By Friday, November 8. turn in:

- topic
- one paragraph summary
- ► at least one reference

 Idea: some small percentage of a population develops a mutation

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- This creates a competing 'strategy', compared to animals without the mutation
 - A strategy is a genetic disposition
 - The payoff corresponds to the likelihood of offspring

An example: a species cooperates while hunting

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Defectors will thrive

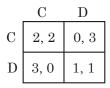
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 - ► Cooperation is not evolutionarily stable

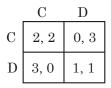
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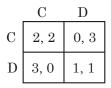


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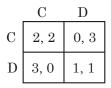


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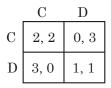
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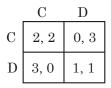
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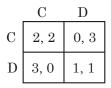


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Cooperators will not thrive



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- Look at payoffs of C and D against $(\epsilon, 1 \epsilon)$
- $u(C, (\epsilon, 1 \epsilon)) = 2\epsilon$
- $u(D, (\epsilon, 1-\epsilon)) = 1+2\epsilon$
- Cooperators will not thrive
- Defection is evolutionarily stable

Definition

In a 2-player symmetric game, a strategy s is **evolutionarily stable** if for sufficiently small numbers $\epsilon > 0$, and any other strategy s^* ,

$$(1-\epsilon) u(s,s) + \epsilon u(s,s^*) > (1-\epsilon) u(s^*,s) + \epsilon u(s^*,s^*)$$

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This is saying that the utility of s in a mixed population $(1 - \epsilon, \epsilon)$ is better than the utility of s^* is the mixed population

► See Handout #7



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