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Algorithmic Game Theory

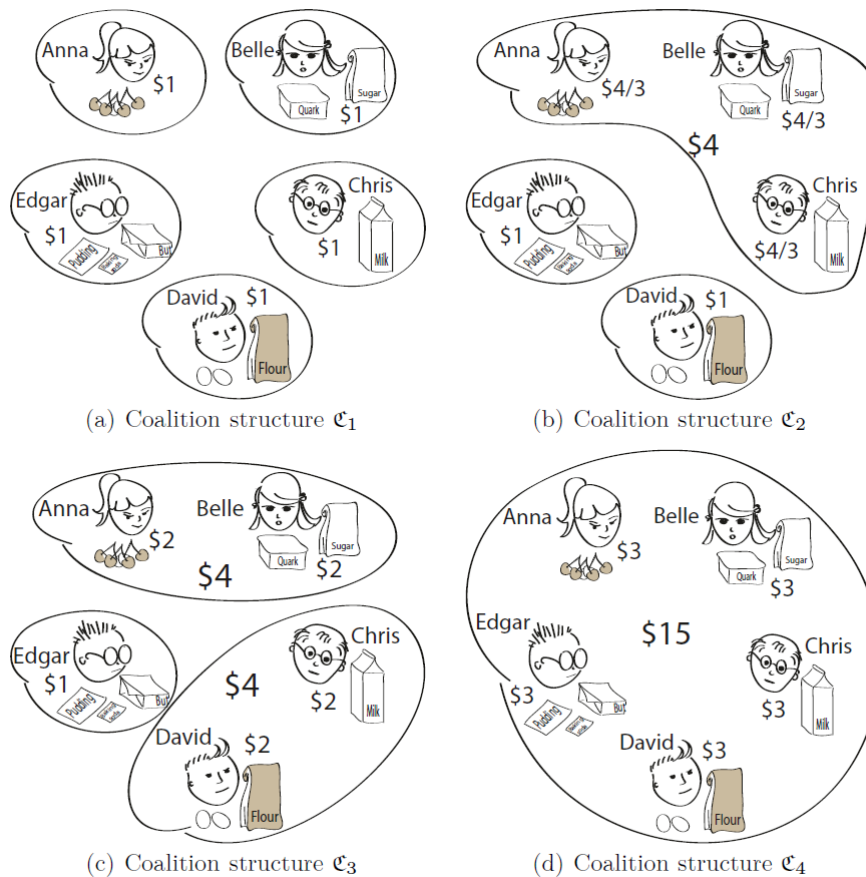
Summer Term 2024

Exercises 11

01–05/07/2024

Problem 1.

Consider the following four coalition structures:



Write down the four coalition structures formally. Then, write down the amount each player receives for each outcome. Finally, argue from the coalitions displayed here whether the characteristic function is monotonic.

Problem 2.

Three players together can obtain \$1 to share, any two players can obtain α , and one player by herself can obtain zero.

Then $v(N) = 1, v(\{1, 2\}) = v(\{1, 3\}) = v(\{2, 3\}) = \alpha, v(\{1\}) = v(\{2\}) = v(\{3\}) = v(\emptyset) = 0$

What is the core of this game? When is the core empty? When is the core non-empty?

Problem 3.

Consider the 3-person game in which no single player can generate any surplus on her own:

$$\begin{aligned}v(\{1\}) &= 0, v(\{2\}) = 0, v(\{3\}) = 0, \\v(\{1, 2\}) &= 7, v(\{1, 3\}) = 6, v(\{2, 3\}) = 5, \\v(N) &= 8\end{aligned}$$

Is the core non-empty? If not, what is the cost of stability/the value of the least core?