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Algorithmic Game Theory

Winter Term 2021/22

Tutorial Session - Week 10

Exercise 1:

Consider three unit-demand buyers and two items a, b with

$$v_{1,a} = 5, v_{1,b} = 3, v_{2,a} = 3, v_{2,b} = 4, v_{3,a} = 2, v_{3,b} = 2 \ .$$

(a) Determine the Walrasian price vector which is determined by the VCG mechanism.

(b) Now find *all* Walrasian price vectors q. Draw these vectors in a coordinate system with axes q_a and q_b.

As a remark, note that the prices defined by the VCG mechanism are the smallest Walrasian prices: We can use the prices from (a) as a lower bound for all Walrasian prices.
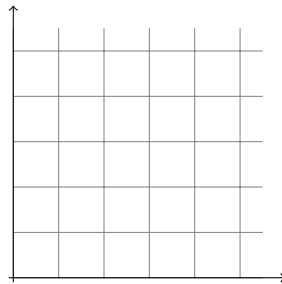
Exercise 2:

Have a look at the single-minded combinatorial auction with three bidders (red, blue, green) and items a, b, c which is depicted below. State all values of $x \in \mathbb{R}_{\geq 0}$ such that there exists a Walrasian equilibrium and prove your claim.