84 Serial cost sharing: Discrete and continuous case

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In this paper we study cost allocation problems and the asymptotic relation between the serial cost sharing method defined in the discrete case (Moulin, 1995), and two different definitions of the serial cost sharing rule in continuous cost allocation problems.

Discrete cost allocation problems arise when goods are produced in indivisible units, and continuum cost allocation problems arise when all the outputs are perfect divisible goods and the level of production can be measured by a real number. We will consider a continuum cost allocation problems as the “limit” of discrete cost allocation problems. These problems are a discrete version of the original one, allowing only a finite number of levels, instead of a continuum. Following this asymptotic approach, we show the relation between the discrete and the continuum serial cost sharing methods.

We construct two different sequences. In the first sequence it its assumed perfect comparability between the units of different goods. Then we show the convergence of the discrete serial cost rule to the continuum extension defined by Friedman and Moulin (1999). In the second sequence, we compare the units of different goods by their stand alone production cost. In this case we show the convergence with a new serial extension, that we call individual cost path solution.

Moreover, we characterized axiomatically these serial cost sharing methods (on discrete and continuum CAP) by a system of similar axioms.

References
