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An Axiomatization of the Pairwise Netting Proportional Rule in Financial Networks

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Abstract
We consider financial networks where agents are linked to each other via mutual liabilities. In case of bankruptcy, there are potentially many bankruptcy rules, ways to distribute the assets of a bankrupt agent over the other agents. One common approach is to first apply pairwise netting of agents that have mutual liabilities and next use the proportional rule to determine the payments on the basis of the net liabilities. We refer to this as the pairwise netting proportional rule. The pairwise netting proportional rule satisfies the basic requirements of claims boundedness, limited liability, priority of creditors, and continuity. It also satisfies the desirable properties of net impartiality, an agent that has two creditors with the same net claims pays the same amount to both creditors on top of pairwise netting, and invariance to mitosis, an agent that splits into a number of identical agents is not affecting the payments of the other agents. We demonstrate that if net impartiality and invariance to mitosis, together with the basic requirements, are regarded as imperative properties, then payments should be determined by the pairwise netting proportional rule.

About the Speaker
During his career, Jean-Jacques Herings has made a number of influential contributions to cooperative game theory [1,2], non-cooperative game theory [3,4], networks [5,6], general equilibrium theory [7,8], and equilibrium computation [9,10]. In [1] a new cost-sharing method is proposed, having the sharing of river water among riparian countries as an important application. A unifying approach to both cooperative and non-cooperative game theory as well as an encompassing solution concept is presented in [2]. Contribution [3] introduces the bisection auction, an auction format that leads to a fast allocation of the object for sale and respects privacy of bidders to the largest extent possible. It is established in [4] that bargaining outcomes converge to the asymmetric Nash bargaining solution for a wide class of bargaining protocols. A theory of link formation among farsighted agents is developed in [5]. It is explained in [6] how bankruptcy of interlinked financial institutions can be handled in a decentralized way. The question how decentralized markets can achieve a competitive equilibrium is answered in [7]. Contribution [8] shows that allocations resulting from the market mechanism are the same as those obtained via decentralized bargaining in matching problems arising in the labor and the housing market. Contributions [9] and [10] present the first algorithms that allow for the computation of equilibria in economies that are subject to price controls and stochastic games, respectively.

Jean-Jacques Herings has been affiliated to the Université Catholique de Louvain, Maastricht University and Tilburg University and, as a visiting professor, to Yale University, the Ecole des Hautes Etudes en Sciences Sociales in Paris, and the City University of Hong Kong. He received many grants like the personal postdoc grant and the VICI-grant from the Dutch Science foundation and the fellowship from the Royal Academy of Arts and Sciences and scientific prizes like the Johannes Cornelis Ruigrok Prijs in 1997 and the Lionel W. McKenzie prize in 2008. He has been extensively involved in the Game Theory Society, as member of its Council from 2011 to 2017, as fellow since 2017, and in the capacity of secretary and treasurer from 2014 to 2022. He has been appointed fellow of the Society for the Advancement of Economic Theory in 2019.

Jean-Jacques Herings has more than 150 publications in the best national and international journals, including Econometrica, Economic Journal, International Economic Review, Journal of Economic Theory, Management Science, Mathematical Programming, and Mathematics of Operations Research. He is part of the editorial board of several renowned international journals and he is highly ranked in the yearly Top 40 of Dutch economists as published by the journal ESB.

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