

MAR14-2013-020158

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Multilevel Complex Networks and Systems¹

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Network theory has been a powerful tool to model isolated complex systems. However, the classical approach does not take into account the interactions often present among different systems. Hence, the scientific community is nowadays concentrating the efforts on the foundations of new mathematical tools for understanding what happens when multiple networks interact. The case of economic and financial networks represents a paramount example of multilevel networks. In the case of trade, trade among countries the different levels can be described by the different granularity of the trading relations. Indeed, we have now data from the scale of consumers to that of the country level. In the case of financial institutions, we have a variety of levels at the same scale. For example one bank can appear in the interbank networks, ownership network and cds networks in which the same institution can take place. In both cases the systemically important vertices need to be determined by different procedures of centrality definition and community detection. In this talk I will present some specific cases of study related to these topics and present the regularities found.

¹Acknowledged support from EU FET Project “Multiplex” 317532.