

1096-60-508

**Mihnea Stefan Andrei\*** ([mihnea.andrei@wpi.edu](mailto:mihnea.andrei@wpi.edu)), 100 Institute Road, #2586, Worcester, MA 01609. *Dynamic models for the default risk of interbanking networks*. Preliminary report.

In 2008 a multitude of banks went bankrupt and had to be bailed out by the government. Although the rest is history, it is important to try to learn from the mistakes of the past. One way in which we could do this is by studying how contagion spreads through a banking system. As we will see, this question manages to bring together ideas from many fields in Mathematics: Combinatorics, Linear Algebra, Calculus, Statistics and Probabilities.

In this presentation we will try to characterize the spread of contagion by finding the expected time until the first bank defaults, the probabilities that each bank will default and some conditional probabilities. In order to do so, we will consider the banks to be the vertices of a graph. We draw an edge between 2 vertices if one of the banks has assets or liabilities with respect to the second one. This relationship is modeled using random walks. Next, this graphical representation can be transformed in a system of linear inequalities. Finally, by considering a multidimensional absorbed Markov chain, and by using PH random variables, we will arrive at a form of our initial problem which can be solved. Also, numerical methods will help us obtain some results and conclusions by implementing the ideas from the mathematical model into MATLAB. (Received September 05, 2013)