LECTURES ON THE COUPLING METHOD

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The coupling method is a powerful and widely used method on probability theory. It is used in several problems and framework and gives usually powerful, surprising and beautiful results. One of its main application is on the study of relaxation to equilibrium of a Markovian system but it plays a major role also in the problem of stochastic monotonicity. Finally a coupling is the basic object to be constructed to define the Monge-Kantorovich-Rubinstein-Wasserstein metric. This is the metric involved in the optimal mass transportation problem.

A coupling is a probability measure on a product space having fixed marginal distribution ν_1 and ν_2 and corresponds to a plan of transference of the distribution of mass ν_1 to the distribution of mass ν_2.

The course will be based essentially on a series of examples.

Useful general references are

T. Lindavall *Lectures on the coupling method* John Wiley and Sons, New York, 1992. Reprint: Dover paperback edition, 2002.

H. Thorisson *Coupling, Stationarity, and Regeneration*

Some useful lecture notes are available at

http://websites.math.leidenuniv.nl/probability/lecturenotes/CouplingLectures.pdf

https://docs.ufpr.br/ lucambio/CE222/2S2011/oct2001.pdf