

From Bisimulations to Metrics via Couplings

Giovanni Bacci

Department of Computer Science, Aalborg University, Denmark

In probability theory, the coupling method is a proof technique that allows one to compare two, possibly unrelated, distributions P and P' by constructing a joint probability distribution, called coupling, with left and right marginals corresponding to P and P' respectively. The choice of such coupling can exhibit interesting relations among P and P' .

In this talk we argue that classical concepts like bisimilarity and bisimilarity metrics are closely related to couplings. Specifically, we show that the task of finding a bisimulation or computing the bisimilarity distance can be conveniently restated as coupling methods among automata.