Reducing a Kripke structure (a labeled graph) on which model-checking properties of reactive concurrent programs has to take place, is an important step—often (space) critical—for verification.

In this talk bisimulation and simulation reduction procedures for Kripke structures are presented, and the most important algorithmic issues related with such procedures are discussed. In particular, both problems will be seen as particular cases of the Coarsest Partition Problem: the search of the coarsest partition refining a given one and stable with respect to a given initial relation. This turns out to be especially useful when efficient algorithms to establish a bisimulation or a simulation quotient are sought.

The first result on a fast algorithm for a coarsest partition problem (due to Hopcroft) goes back to the seventies and was motivated by the application to the minimization of Finite State Automata. Subsequently a number of authors have contributed to the search for efficient procedures for the Relational Coarsest Partition Problem (bisimulation) and, moreover, the coarsest-partition-problem point of view recently turned out to be the key for an highly space efficient simulation reduction algorithm. (Received January 18, 2002)