

A Priori System-Level Interconnect Prediction: Rent's Rule and Wire Length Distribution Models

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The exciting, new field of System-Level Interconnect Prediction emerged from research of the early 1970's but it took until 1999 before a cohesive research community for interconnect prediction was established with the start of the SLIP Workshop two years ago. New research results are becoming available and the last couple of years have brought both more interest and more progress in the field than in the thirty years before. This tutorial is an introduction to the field and mainly provides an overview of the basic models in wire length prediction as well as an introduction to some of the recent advances in system-level interconnect prediction.

The tutorial starts with a justification of the research subject (why do we want to predict wire lengths?) and then presents the basic models wire length prediction techniques are built on: a model for the circuit, a model for the architecture and a layout model. A significant amount of time is spent on Rent's rule which is the basic rule for a priori interconnect estimation. The different wire length prediction methods are introduced progressively from the earliest to the newest and from less accurate to more accurate. Finally, a few recent advances in the field are described in short.