

Behavioural Pseudometrics for Probabilistic Systems

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Abstract.

The majority of verification techniques for concurrent systems only produce qualitative information. Questions like “Does the system satisfy its specification?” and “Do the systems behave the same?” are answered “Yes” or “No”. Such discrete Boolean-valued reasoning sits uneasily with models featuring quantitative data, like probabilistic transition systems. To address this problem, pseudometrics that assign a distance, a real number between 0 and 1, to each pair of probabilistic transition systems have been proposed. Such a pseudometric yields a smooth, quantitative notion of behavioural equivalence. The distance between systems is used to express the similarity of their behaviour. The smaller the distance, the more alike the systems behave. In particular, the distance between systems is 0 if they are behaviourally indistinguishable.

In my talk, I will discuss some of these pseudometrics that have been introduced in the literature. My presentation is based on joint work with James Worrell, Steven Shalit and Hongming Wu.