Abstract.

This paper compares two models of concurrency, Milner's Calculus of Communicating Systems (CCS) and the *failures* model of Communicating Sequential Processes (CSP) developed by Hoare, Brookes and Roscoe. By adapting Milner's synchronisation trees to serve as notation for both CCS and CSP, we are able to define a representation mapping for CSP processes. We define an equivalence relation on synchronisation trees which corresponds precisely to the notion of *failure equivalence*. This equivalence relation identifies two trees if and only if the processes represented by the trees have identical failure sets. Milner's calculus is founded on a different notion, *observation equivalence*. We show how these two equivalences are related. Just as Milner's equivalence can be characterised as the smallest relation satisfying a set of axioms, we find a suitable set of axioms for the failures equivalence relation. This again makes explicit the differences between the two systems, as well as revealing that the semantic models underlying CCS and CSP are comparable.