

# Linking theories of concurrency

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**Abstract:** We construct a Galois connection between the theories that underlie CCS [7] and CSP [4]. It projects the complete transition system for CCS onto exactly the subset that satisfies the healthiness conditions of CSP. The construction applies to several varieties of both calculi: CCS with strong, weak or barbed simulation, and CSP with trace refinement or failures refinement, or failures/divergence. We suggest the challenge of linking other theories of concurrency by Galois connection. © Springer-Verlag Berlin Heidelberg 2005.

**Index Keywords:** Computer simulation; Computer system recovery; Barbed simulation; Complete transition system; Failures refinement; Galois connection; Concurrency control

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## References:

- Bergstra, J.A., Klop, J.W., Algebra of communicating processes with abstraction (1985) *Theoretical Computer Sciences*, 37 (1), pp. 77-121
- Brookes, S.D., Hoare, C.A.R., Roscoe, A.W., A theory of communicating sequential processes (1984) *Journal of the ACM*, 31
- Gardiner, P., Power simulation and its relation to Traces and Failures Refinement (2003) *Theoretical Computer Science*, 309 (1), pp. 157-176
- Hoare, C.A.R., (1985) *Communicating Sequential Processes*, , Prentice Hall
- Hoare, C.A.R., Jifeng, H., (1998) *Unifying Theories of Programming*, , Prentice Hall
- Larsen, K.G., Skou, A., Bisimulation through probabilistic testing (1991) *Information and Control*, 94 (1)
- Milner, R., (1989) *Communication and Concurrency*, , Prentice Hall
- Milner, R., (1999) *Communicating and Mobile Systems: The  $\pi$ -calculus*, , Cambridge University Press
- Milner, R., Sangiorgi, D., Barbed simulation (1992) *Lecture Notes in Computer Science*, 623, pp. 685-695
- De Nicola, R., Hennessy, M., Testing equivalence for processes (1983) *Theoretical Computer Science*, 34
- Park, D.M.R., Concurrency and automata on infinite sequences (1980) *Lecture Notes in Computer Science*, 14
- Plotkin, G.D., (1981) *A Structural Approach to Operational Semantics*, , Report DAIMI-FN-19, Computer Science Department, Aarhus University, Denmark
- Roscoe, A.W., (1998) *The Theory and Practice of Concurrency*, , Prentice Hall
- Tarski, A., A lattice-theoretical fixedpoint theorem and its applications (1955) *Pacific Journal of Mathematics*, 5, pp. 285-309