D'Hondt, Ellie; **Panangaden, Prakash**
Quantum weakest preconditions. (English) Zbl 1122.68058
Math. Struct. Comput. Sci. 16, No. 3, 429-451 (2006).

Summary: We develop a notion of predicate transformer and, in particular, the weakest precondition, appropriate for quantum computation. We show that there is a Stone-type duality between the usual state-transformer semantics and the weakest precondition semantics. Rather than trying to reduce quantum computation to probabilistic programming, we develop a notion that is directly taken from concepts used in quantum computation. The proof that weakest preconditions exist for completely positive maps follows immediately from the Kraus representation theorem. As an example, we give the semantics of Selinger's language in terms of our weakest preconditions. We also cover some specific situations and exhibit an interesting link with stabilisers.

MSC:

68Q10 Modes of computation (nondeterministic, parallel, interactive, probabilistic, etc.)
81P68 Quantum computation

Cited in **1** Review
Cited in **18** Documents

Full Text: DOI

© 2021 FIZ Karlsruhe GmbH