

Towards a Knowledge-based Approach to Byzantine Fault-Tolerant Clock Synchronization and Related Problems

January 11, 2017

Extending the knowledge-based approach (epistemic logic) [HM90] to Byzantine fault-tolerant systems. In particular, I am interested in finding an equivalent to the "centipedes" structures [BM14] for Byzantine fault-tolerant clock synchronization [WS09,RS11].

Works directions :

- Capturing Firing Rebels with Relay: Patrik told me today that he will probably not be able to also work out the necessary and sufficient knowledge for this important extension, which is actually the same as Srikanth & Toueg's consistent broadcasting primitive. (Patrik has already a contract with Google and hence does not have time to extend his thesis to something that could be published ...)
- Identifying necessary and sufficient communication primitives (analogous to centipedes) that match the necessary and sufficient knowledge for our problems.
- Moving from asynchronous message passing to message passing with lower- and upper-bounded delays.
- Studying the necessary and sufficient knowledge of other important problems (like consensus) with Byzantine processes.
- Making the connection to communication complexity (I have another Master student, who is writing his thesis on this topic ...).

References

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- [2] Peter Robinson and Ulrich Schmid. The asynchronous bounded-cycle model. *Theoretical computer science*, 412(40):5580–5601, 2011.
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- [4] Josef Widder and Ulrich Schmid. The theta-model: achieving synchrony without clocks. *Distributed Computing*, 22(1):29–47, 2009.