

# Verifying Fault-Tolerance in Parameterised Multi-Agent Systems

A. Lomuscio\*

In this talk I will present a technique to evaluate the fault-tolerance of a multi-agent system whose number of agents is unknown at design time. I will describe a method for injecting a variety of non-ideal behaviours, or faults, studied in the safety-analysis literature into the abstract agent templates that are used to generate an unbounded family of multi-agent systems with different sizes. The parameterised fault-tolerance problem will be defined as the decision problem of establishing whether any concrete system, in which the ratio of faulty versus non-faulty agents is under a given threshold, satisfies a given temporal-epistemic specification. I will describe a sound and complete technique for solving the problem for the semantical set-up considered. If time permits an implementation and a case study identifying the threshold under which the alpha swarm aggregation algorithm is robust to faults against its temporal-epistemic specifications will be demonstrated.

The talk is based on joint work with P. Kouvaros [KL17].

## References

- [KL17] P. Kouvaros and A. Lomuscio. Parameterised verification of infinite state multi-agent systems via predicate abstraction. In *Proceedings of the 24th International Joint Conference on Artificial Intelligence (IJCAI17)*. AAAI Press, 2017. To Appear.

---

\*Department of Computing; Imperial College London; UK