WiP Abstract: A Framework on Profiling Cross-Domain Noise Propagation in Control CPS

Feng Tan\(^1\), Liansheng Liu\(^2\), Stefan Winter\(^3\), Qixin Wang\(^1\), Neeraj Suri\(^3\), Lei Bu\(^4\), Yu Peng\(^2\), Xue Liu\(^5\), Xiuyan Peng\(^2\)

\(^1\) The Hong Kong Polytechnic University, Hong Kong S.A.R.
\(^2\) Harbin Institute of Technology, China
\(^3\) TU Darmstadt, Germany
\(^4\) Nanjing University, China
\(^5\) McGill University, Canada

Question: How will noises from the cyber sub-system affect control CPS?

Answer: A cross-domain noise profiling framework:

Monte Carlo of physical plant's initial state + noise, injected into the cyber subsystem.

Hybrid-automata reachability measures impact of noises cross-domain.

Lyapunov invariant set theory accelerates reachability calculation.