Robustness Analysis of Cyber-Physical Systems

INTRODUCTION

• A cyber-physical system (CPS) is a physical system that is monitored and controlled by (networked) computers (i.e., cyber component). CPSs are ubiquitous in smart cities.

• CPSs are modeled using hybrid systems, which contain both continuous and discrete phases. As such, CPSs exhibit behaviors (e.g., Zeno behavior) which are absent in purely continuous or purely discrete systems.

APPLICATIONS

Examples:
- robotics systems
- autonomous cars
- medical monitoring
- 3D printing

OBJECTIVES

• One of the main challenges of CPS is robustness.

• Informally, a CPS is robust if its output does not change significantly with small perturbations of the input.

• Robustness is particularly crucial in safety/security critical systems.

• Classical mathematical structures are not adequate for analyses of CPSs. Hence, our main objective is to propose novel mathematical structures for robustness analysis.

REFERENCES