SANDIP ROY, Washington State University

Algebraic Graph Theory Techniques for Resilience in Critical Infrastructures

As critical infrastructures become pervasively cyber-enabled, they are increasingly being subjected to heterogeneous threats arising from both the cyber world and physical world. At the same time, individual threats are having growing impact on infrastructure performance, as the infrastructures become increasingly complex and stressed. The growing susceptibility of critical infrastructures to threats has fostered research on the design of resilient decision algorithms and controls for infrastructures. In this talk, I will argue that algebraic graph theory concepts can support the design of resilient decision-making capabilities for infrastructures. In particular, using case studies from several domains (air traffic management, microgrid control), I will show that algebraic graph theory metrics give insight into the vulnerability of infrastructures to threats, and also enable positioning of control resources to mitigate these vulnerabilities.