Energy Data Analytics through the Lens of Graph Signal Process

Tuesday, April 25, 2023
2:00 pm – 3:00 pm
Olin 202
Open to the Public

availability of large volume of energy data in smart grids provides new opportunities t
critical functions. The energy data, by nature, bear structures due to the underlying interactions among th
system, which can be the result of physics of the electricity as well as operational, policy, and cyber funct
governing these systems. A new perspective and technical paradigm in analyzing energy data can be bu
growing field of Graph Signal Processing (GSP). GSP extends the classical signal processing technique
graph domain, which makes it suitable for analyzing structured data and the dynamics of systems with in
components. By defining signals over the vertices of a graph, namely graph signals, the interactions and
measurements in smart grids can be modeled, captured and analyzed through the lens of rich GSP tools
talk, GSP-based approaches in addressing two problems in smart grids including cyber and physical stress
localization as well as power system state information recovery will be presented. For the first problem, t
cyber and physical stresses in vertex, graph-frequency and joint vertex-frequency GSP domains will be discuss
form the foundation for the proposed GSP-based techniques for detection and locating of stresses. Recover
unobservable power system components due to cyber attacks or limited meter availability is also an impo

nce, signal processing, graph