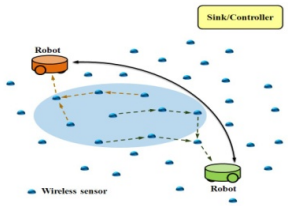
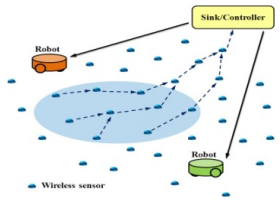
FUNDAMENTAL ADVANCES IN CONTROL OF WIRELESS SENSOR AND ROBOTIC NETWORKS

Depending on the task at hand, a WSRN can possibly give rise to two basic communication architectures among the various nodes.



Automated architecture



Semi-automated architecture

- Wireless Sensor and Robotic Networks (WSRN) are composed of interacting wireless sensors, robotic systems, and sink/central controllers communicating over a wireless network.
- The objective of the project is to investigate control algorithms for robotic systems based on the sensed data and study coordination strategies between the robots communicating over inherently unreliable wireless networks.
- Studies accomplished in the first year:
  - In the semi-automated architecture, passivity-based control was harnessed as fundamental tool to study control of robotic systems under time varying input/output delays.
  - In the automated architecture, control algorithms were developed to guarantee task space synchronization of distributed robots communicating under times delays.
  - A semi-passivity property for robotic systems was developed and exploited to study robustness to disturbances.