
Faculty: Michael Hadjitheodosiou, John Baras    Student: Yingyong Chen

**A Sample Target-tracking Wireless sensor Network (WSN)**

**Probability-based SAP**
- Sensors activate themselves with certain probability such that expected value of number of active sensors equals to the number required by the application.
- **Pros**: simple implementation, fully decentralized; no communication overhead.
- **Cons**: no guarantee that enough number of sensors will be active, measured by probability of undercoverage ($P_{uc}$) which is defined as the probability that number of active sensors are fewer than required.

**Declaration-based SAP**
- Nodes activates itself by broadcasting an Activation Control Message (ACM) after a random delay.
- Only the first S nodes which successfully transmitted their ACMs will be activated.
- **Pros**: low $P_{uc}$ with proper parameter values.
- **Cons**: Introduce communication overhead.

**Redundancy-Aware Routing**

**Link metric:**

$$C_{ij}(t) = \left[1 + SI_i(t)\right]^a \left[\frac{E_i(0)}{E_i(t)}\right]^b \left[e_{rx} + e_{tx}(i,j)\right]^g$$

**Notations:**
- S: Number of active nodes required by the application
- N: Number of nodes available in the region
- Degree of Redundancy: DoR=N/S; Strategic-Importance: SI=1/DoR