

Swarm Intelligence H-414

Swarm robotics

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Synchronization

- ▶ Large number of individuals coordinate to act in unison
- ▶ The agents sync without any centralized control nor absolute time reference
- ▶ Collective behavior → The actions of robots have an impact on their peers
- ▶ Inspired from social insects
 - ▶ Fireflies glow in sync to attract mates
 - ▶ <https://www.youtube.com/watch?v=0B0jTMkyfIA>

Exercise

Goal:

All the robots light up their LEDs at the same time

Setup:

- ▶ Every robot emits a signal every T time steps
- ▶ Same frequency
 - ▶ Value T is the same for all the robots
- ▶ Different phase
 - ▶ Each robot initializes a counter with a *random* value (in the init function)

Remember:

- ▶ No central orchestrator
- ▶ Interaction between pairs leads to global coordination

Material:

<https://iridia.ulb.ac.be/courses/2019/h-414/>