Collaborative transmission in wireless sensor networks

Organisational

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Time schedule

- 3 hours per week (2+1)
  - Tuesday 15:00 – 16:30, IZ 161 (lecture)
  - Tuesday 16:45 – 18:15, IZ 161 (exercise biweekly)
  - http://www.ibr.cs.tu-bs.de/courses/ws1011/collab/

Vorlesung	Übung	Raum	Thema	Material
26.10.2010; 15:00 - 16:30		IZ 161		Organisatorisches
				Einführung in drahtlose Sensornetze
02.11.2010; 15:00 - 16:30		IZ 161		Einführung in drahtlose Sensornetze
09.11.2010; 15:00 - 16:30		IZ 161		Grundlagen der drahtlosen Kommunikation
	09.11.2010; 16:45 - 18:15	IZ 161	Kommunikation in drahtlosen netzen	Übungsblatt 1
16.11.2010; 15:00 - 16:30		IZ 161		Grundlagen der Wahrscheinlichkeitsrechnung
23.11.2010; 15:00 - 16:30		IZ 161		Evolutionäre Algorithmen
	23.11.2010; 16:45 - 18:15	IZ 161	Drahtlose Kommunikation und Wahrscheinlichkeitsrechnung	Übungsblatt 2
30.11.2010; 15:00 - 16:30		IZ 161		Evolutionäre Algorithmen
07.12.2010; 15:00 - 16:30		IZ 161		Evolutionäre Algorithmen
	07.12.2010; 16:45 - 18:15	IZ 161	Evolutionäre Algorithmen	Übungsblatt 3
14.12.2010; 15:00 - 16:30			Keine Vorlesung	Keine Vorlesung
04.01.2011; 15:00 - 16:30			Keine Vorlesung	Keine Vorlesung
11.01.2011; 15:00 - 16:30			Keine Vorlesung	Keine Vorlesung
18.01.2011; 15:00 - 16:30			Keine Vorlesung	Keine Vorlesung
25.01.2011; 15:00 - 16:30		IZ 161		Kooperative Übertragungsstrategien
01.02.2011; 15:00 - 16:30		IZ 161		Verteiltes Beamforming in drahtlosen Sensornetzen
	01.02.2011; 16:45 - 18:15	IZ 161	Analyse des Optimierungsverfahrens	Übungsblatt 4
08.02.2011; 15:00 - 16:30		IZ 161		Alternative Optimierungsumgebungen und algorithmische Verbesserungen

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Lecture and exam

- The lecture is about
  - Cooperative and collaborative transmission schemes for wireless sensor networks
- We will
  - introduce the general problem
  - discuss various solutions
- Exam is part of the module Verteilte /Ubiquitäre Systeme

$$V = \frac{4}{3}\pi r^3$$
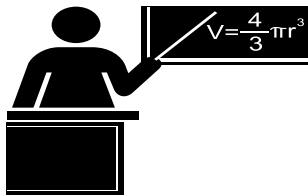
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Script and exercises

- A script is available on the homepage of the lecture:
  - http://www.ibr.cs.tu-bs.de/courses/ws1011/collab/
- Exercises can be downloaded and solved approximately one week in advance from the lecture homepage

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Strategy to successfully complete the lecture

- Try to work on the exercises until you got it.
- Dont start learning just before the examination
- Communication helps:
    - Talking with others about the topic helps you understand and memorise
    - Ask when you didn't understand something
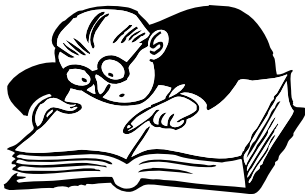
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Overview and structure

- Wireless sensor networks
- Wireless communications
- Basics on probability theory
- Randomised search approaches
- Cooperative transmission schemes
- Distributed adaptive beamforming
  - Feedback based approaches
  - Asymptotic bounds on the synchronisation time
  - Alternative algorithmic approaches
  - Alternative Optimisation environments
- An adaptive communication protocol

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Participate !

- Participation during lecture and exercises to improve comprehension
- Opportunities:
  - Interactive lecture and exercise: Participate!
  - Solve the exercises in advance
    - (you will understand the problems better and detect things that you did not understand)
  - Present your solution
  - Present a short Wrap-Up (ca. 5 min.) of the last lecture
  - Participate in the summary of the current lecture (at the end of the lecture)