

Capacity enhancement methods for radio interface (2 cr)

Lectures: Friday 12-14. room F201

Wednesday 11-13. room F201 (together with exercises)

Teacher: Lic. Sc. (Tech.) Kalle Ruttik, room 218 (Otakaari 7),
tel. 4512354, e-mail: Kalle.Ruttik@hut.fi

Home Page: <http://www.comlab.hut.fi/opetus/630/index.html>

Requirements

To pass the course

Exam: Max 50 p. to pass 18 p.

18 - 24 → 1

25 - 31 → 2

32 - 38 → 3

39 - 45 → 4

45 - 50 → 5

Home exercises give bonus points.

Final Grade: Exam Grade + 0.3 Exercises Grade

4 exercises exercises 5 p. each.

Home assignment 15 p..

15 → 1

18 → 2

21 → 3

24 → 4

27 → 5

30 → 6

Content

- Decision theory
 - Simple hypothesis testing (21.01.2005)
 - Composite and multiple hypothesis testing (26.01.2005)
 - Performance evaluation (28.01.2005)
- Turbo processing
 - Turbo principle (2.02.2005)
 - Turbo decoding algorithms (4.02.2005)
 - Applications (9.02.2005)
- Multiple Input Multiple Output (MIMO) systems
 - Channel characteristics, capacity (11.02.2005)
 - Space-time modulation algorithms (16.02.2005)
 - Linear space-time codes algorithms (18.02.2005)
- System level capacity. (23,25.02.2005)

Literature

Lecture material

L. Hanzo, T.H. Liew, B.L. Yeap, *Turbo Coding, Turbo Equalisation and Space-Time Coding for transmission over Fading Channels*, Wiley, 2002, 748 pp.

H.L. Van Trees, *Detection, Estimation, and Modulation Theory*, Part I, 1968, Wiley, 697 pp.

X. Wang, H. V. Poor, *Wireless Communication Systems*, 2004, Prentice Hall, 682 pp.

T.M. Cover and J.A. Thomas *Elements of Information Theory*, Wiley, New York, 1991.