Approximation Algorithms - 2013

Course Information

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- Theoretical Computer Science Cheat Sheet by Steve Seiden

Professor of the course

- Flávio Keidi Miyazawa
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- Room: IC1-30

Topics

In this course, we will cover several techniques and results in the approximation of algorithms approach:

- Complexity and Approximation classes
- Combinatorial approximation algorithms
- Linear programming methods
- Probabilistic methods
- Semidefinite programming method
- Inapproximability results and Probabilistic Checkable Proofs

Some problems that we will consider during the course

- Knapsack
- Bin packing
- Traveling Salesman
- Maximum Cut
- Steiner Tree and Steiner Forest
- Task scheduling
- Vertex Cover
- Set Cover

- Maximum Satisfiability
- Vertex coloring
- Some other problems

Evaluation

There will be one test (*T*), a presentation/seminar with written text and class participation (*P*) and lists of exercises (*L*).

The grade *L* is the average score of *t* lists of exercises (*t* is at least 6). To obtain the score of a list of exercises, the professor will correct the same exercise of the list (randomly selected) for all students. The value *T* will be obtained considering the seminar and text contents, the presentation and the participation in the other seminars.

The value N is equal to (P+T+L)/3. Students of the course MC748 can perform an additional exam (*E*), only if N<5,0. In this case, the final grade *F* is equal to (N+E)/2.
For graduate students, the final grade is computed using the following table conversion.

Value of N	Final grade
N>=8.5	A
7.0<=N<8.5	B
5.0<=N<7.0	C
N<5.0	D

List of exercises

- List 1.

Important dates

- Test: October 22.
- Lists of exercises: at least one week for each list.

Seminars

- To be announced.

Bibliography

- V. Vazirani. Approximation Algorithms. 2001. Springer-Verlag.

- D. P. Williamson and D. B. Shmoys. The Design of Approximation Algorithms. 2010. Cambridge University Press (disponível online).

- M.H. Carvalho, M.R. Cerioli, R. Dahab, P. Feofiloff, C.G. Fernandes, C.E. Ferreira, K.S. Guimarães, F.K. Miyazawa, J.C. Pina Jr., J. Soares, Y. Wakabayashi. Uma introdução sucinta a algoritmos de aproximação. 23o Colóquio Brasileiro de Matemática, IMPA, Rio de Janeiro.

- D.S. Hochbaum (ed). Approximation Algorithms for NP-Hard Problems, PWS Publishing Company, 1997.

- several papers.