

compsimf20em

Számítógépes szimulációk

Computer simulations

Course outline and requirements
2023

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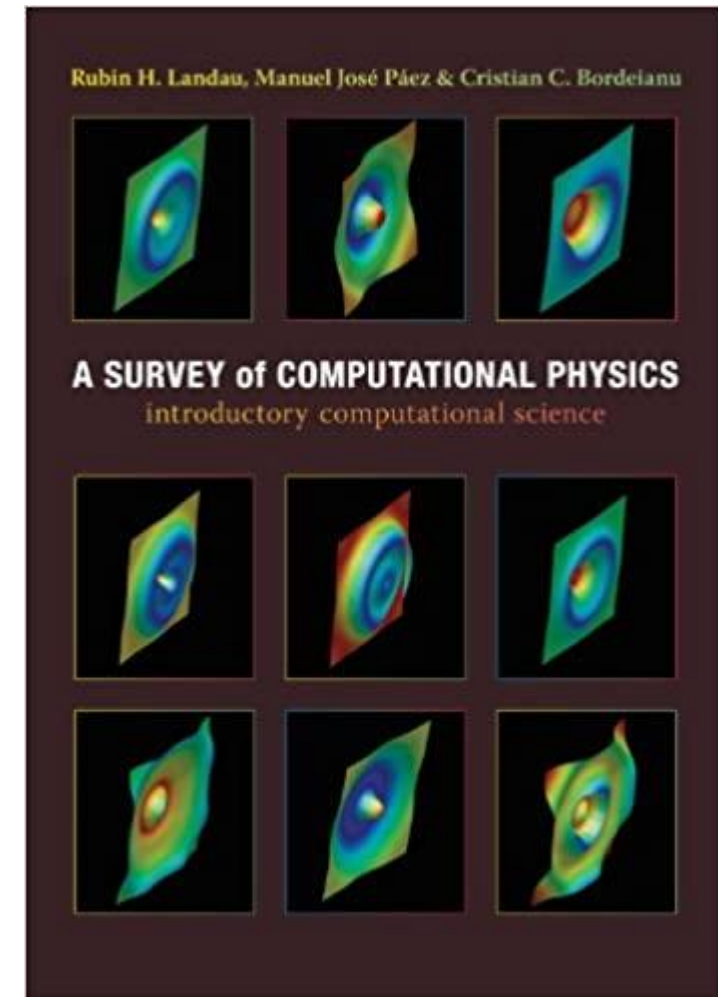
- **Course:** Computer simulations, compsimf20em, Tuesdays 8:15-9:45, ELTE TTK, 7.14 lecture room
 - Only first 4 lectures in person, then consultations + TEAMS presentations
 - See requirements at: <https://icsabai.github.io/simulationsMsc/#reqs>
- **Lecturer:** István Csabai, office: 5.102
- **Teaching assistants:** Orsolya Pipek, Zoltán Udvarnoki, Balázs Pál, Mirkó Mocskonyi
- **Contact:** szamszimmsc(at)gmail.com
 - Questions, requests, etc. concerning the class.
 - Special problems only: istvan.csabai(at)ttk.elte.hu
- **ELTE Teams channel:** [Crs 23-24-1 compsimf20em 1](#)
- **Web page:** <https://icsabai.github.io/simulationsMsc/>

Goals:

1. Learn about the role of computers in modern sciences -> **“Outlook lectures”**
2. Get an overview of computational approach in various areas of physics -> **Textbook, self-paced reading**
3. Improve computer simulation skills -> **Projects**

2. Textbook

- **Rubin H Landau, Manuel J Paez, & Cristian Bordeianu: A Survey of Computational Physics** -introductory computational science , Princeton University Press, 2008
 - Links at the class page for: PDF from [Compadre](#), updates at the [author's website](#), annotated [local copy](#)
- **YOU** have to **read the book** during the semester self-paced
- Previous year's lecture [recordings](#) w/ discussion of chapters are available **online** in Teams
- Chapters' topics will be reviewed on next classes
- Consultations, if needed
- The book's content is the basis of
 - **Projects'** topics
 - **Questions** at semester presentation
 - Part of your **final MSc exam**



3. Projects

- NUMERICAL EXPERIMENT -> REPORT + code/notebook (not just the code!)
 - Detailed **requirements, deadlines**: [web page](#)
- Project1: Topic related to chapters 9-13 of the course book
 - Ordinary differential equation simulations
 - Fourier analysis
 - Wavelet analysis, data compression
 - Nonlinear dynamics, chaos
 - Fractals and growth processes
- Project2: Topic related to chapters 15-20 of the course book
 - Statistical physics simulations
 - Molecular dynamics
 - Elliptic partial differential equations
 - Wave equations
 - Fluid dynamics
 - Integral equations

3. Projects – cont'd

Where to get project topic?

- Check out the “Assessment” section at the end of book chapters for ideas
 - Check out my notes in the [annotated book](#)
 - Check out the ideas listed on the course [webpage](#)
 - Search the web for ideas
 - You may repeat some (simple) numerical experiment from research papers
 - Your own (related) ideas are welcome, too! If you are not sure, if it is appropriate: Ask!
 - Select something interesting, but doable!
- Check out the [formal requirements!](#)
 - Submit short descriptions in advance (deadlines!)
 - Submit project report (deadlines!)
 - Review feedback
 - Presentations at the end of semester