

Numerical Techniques 2022–2023

0. Welcome

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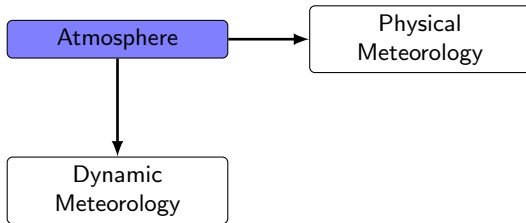
Postgraduate Studies in Weather and Climate Modeling

Ghent University

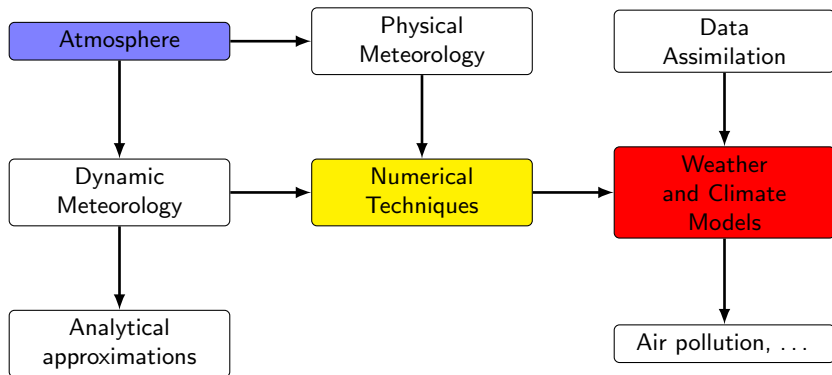
- Welcome
- Context: why numerical techniques
- Objectives of this course
- Course material
- Practical information

Why numerical techniques?

Atmosphere



Why numerical techniques?



- Get hold of problems that occur due to solving equations numerically (with a computer)

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- Don't be frightened by code
... but it's no course on Linux or Fortran either!

date	14h30	16h00	17h30
03/10		Introduction, Stability	
10/10		Time discretization	Practicum Oscillation equation
11/10	Space discretization	Practicum Oscillation equation	
17/10		Spectral models	Practicum Advection equation
18/10	Nontrivial aspects	Practicum Advection equation	
31/10		Semi-Implicit Semi-Lagrangian models	
14/11		Parallel computing and Project assignment	
06/03		Project support session	
28/03		Student project presentations	

Theory lessons at auditorium 3.1; practical sessions at PC room Konrad Suze

- Slides and exercise guidelines will appear on Ufora
- References:
 - ▶ *Numerical Methods for Wave Equations in Geophysical Fluid Dynamics*, Dale R. Durran, Springer, 1999, ISBN 0-387-98376-7.
 - ▶ *Chebyshev and Fourier Spectral Methods*, John P. Boyd, Springer, 2001, ISBN 978-3-540-51487-9.
- Some papers (depending on project)

- Check Ufora for modifications to time schedule
- Exercises in Linux
 - ▶ Warning: experimental!
We will use High-Performance Computing (HPC) infrastructure of UGent: create account on
`https://www.ugent.be/hpc/en/access/faq/access`
 - ▶ access through browser via `https://login.hpc.ugent.be`
 - ▶ ... or you can just install Linux on your laptop
- Programs needed: gfortran, Rstudio
- Evaluation: student project (2/3/4 persons) on simple model
 - ▶ presentation for other students
 - ▶ (small) report

Questions?