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dictionary

# Numerical Techniques 2022–2023

## 0. Welcome

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Postgraduate Studies in Weather and Climate Modeling

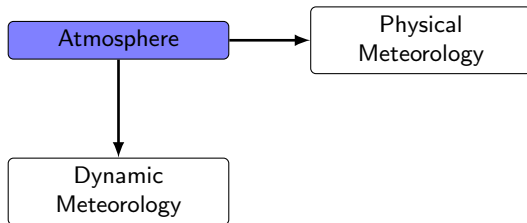
Ghent University

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

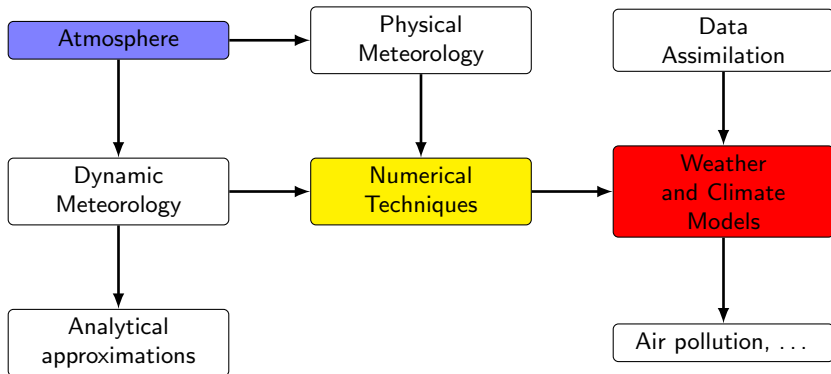
# Why numerical techniques?

Atmosphere

# Why numerical techniques?



# 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	16h00 (Auditorium 3.1)	17h30 (PC-room Konrad Zuse)
27/09	Introduction, Stability	
04/10	Time discretization	Oscillation equation
18/10	Space discretization	Oscillation equation
25/10	Spectral models	Advection equation
08/11	Towards nontrivial models	Advection equation
15/11	Semi-Implicit Semi-Lagrangian models	
22/11	Parallel computing and Project assignment	
29/11	Project session (PC-room)	
06/12	Project session (PC-room)	
20/12	Presentations	

- 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
  - ▶ helios server of UGent: create account on <https://helpdesk.ugent.be/account/en/helios.php>
  - ▶ access from Windows via PuTTY (installed in PC rooms)
  - ▶ ...or you can try to 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?