

Computational Methods for Building Physics and Construction Materials

Lite Version

Date: March 14th, 2020: 14:00-18:30

Venue: ISISE, UMinho, rsc2020.civil.uminho.pt/



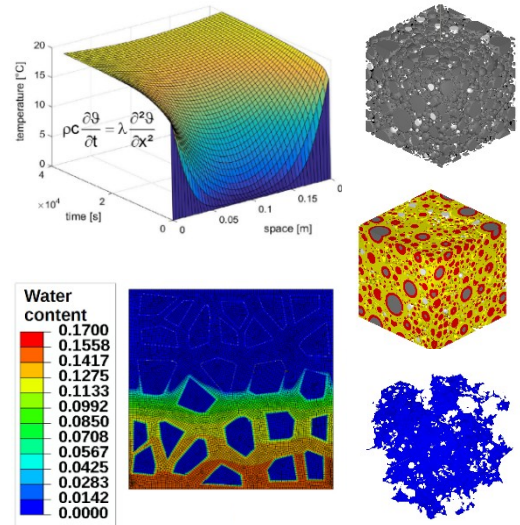
TECHNISCHE
UNIVERSITÄT
DARMSTADT

INSTITUT FÜR
WERKSTOFFE
IM BAUWESEN

Teachers: Prof. Dr. ir. E.A.B Koenders, Dr. chem. Ing. N. Ukrainczyk, Dr. Antonio Caggiano

Course description:

The course contains lecturing on different computational methods for solving partial differential equations, namely Finite Difference, Method of Lines and Finite Elements. Numerical solution strategies include explicit and implicit discretization, boundary conditions, and implementation of physical processes that frequently occur in construction materials. Typical problems that will be addressed in this course will be on modelling transient heat transport phenomena and/or moisture in porous media. The course will provide full solution strategies and approaches, so from a physical problem, to schematization and discretization, to boundary conditions evaluation, and to a computational solution.



Course program:

Date	Teacher	Lecture	Theme	Time [min]
14-Mar-20	EK	V0	Introduction to the EAC RILEM Course	10
14-Mar-20	EK	V1	Transient diffusion problem (2D) - Explicit method implementation in Excel	80
14-Mar-20	NU	V2	Transient diffusion problem (2D) - Implicit methods implementation in Octave	90
14-Mar-20	AC	V3	Transient diffusion problem (2D) - FEM implementation in Octave	90

Objective:

Objective of the course is to train MSc, PhD and Postdoc students on how to solve common differential equations and what solution strategies can be applied to simulate physical problems in construction materials. After finishing this course, students will be able to use computational methods skills for their own research.

Costs:

– MSc students, PhDs and Postdocs: 100 Euros

This includes course attendance and materials (PDF copy of PPTs, Octave subroutines and Excel spreadsheets).

Contact:

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Environmental and Civil Engineering / Institute of Construction
and Building Materials

