

## Seminar 2021/2022

### From Newton's cooling law to turbulent filtration of non-Newtonian fluids through a porous medium

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<https://videoconf-colibri.zoom.us/j/86389857315>

Differential equations govern several phenomena and their study gives rise to some answers and several other questions. In this seminar we go on a tour starting at Newton's cooling law (an ordinary differential equation), stopping briefly at some well known partial differential equations (pde) and ending on a doubly nonlinear pde. We will present recent results concerning regularity aspects of the weak solutions to the doubly nonlinear pde

$$u_t - \operatorname{div}(|u|^{m-1}|Du|^{p-2}Du) = 0, \quad p > 1.$$

#### References

- [1] S. Fornaro, E. Henriques and V. Vespri, Regularity results for a class of doubly nonlinear very singular parabolic equations, *Nonlinear Anal.*, 205 (112213), 30 pp, 2021.
- [2] S. Fornaro, E. Henriques and V. Vespri, Stability to a class of doubly nonlinear very singular parabolic equations, *manuscripta math*, 2021 <https://doi.org/10.1007/s00229-021-01302-w>
- [3] S. Fornaro, E. Henriques and V. Vespri, Harnack type inequalities for the parabolic logarithmic p-Laplacian equation title of the paper, *Le Matematiche*, 75, 277–311, 2020.