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CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES  
CENTER FOR R&D IN MATHEMATICS AND  
APPLICATIONS

## Gravitational Geometry and Dynamics (GGD) Group Seminar

# Finsler spacetimes and its applications to cosmology and wildfire propagation

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We will first show how Finsler spacetimes naturally appear as a tool to solve the time-dependent Zermelo problem in a manifold  $M$ , or more generally, the problem of finding the shortest trajectory in time when the velocity is prescribed at any direction and any instant of time, namely, the velocity is a function of the direction and the time. It turns out that the shortest trajectories are the projections to  $M$  of lightlike geodesics in the non-relativistic spacetime  $\mathbb{R} \times M$ , where the first coordinate is the absolute time. These findings can be applied to wildfire propagation models as the velocity of the fire in every direction and instant of time is prescribed, namely, it depends on the wind, the slope, the vegetation, humidity... so the propagation of the fire can be obtained computing the orthogonal lightlike geodesics to the firefront. On the other hand, Finsler spacetimes can be used as cosmological models in situations with a certain degree of anisotropy. We will discuss the meaning of the stress-energy tensor in this context and some proposals for Einstein field equations.

**Wednesday, April 6th 2022, 14H30 || Zoom online**

Zoom Meeting ID: 852 8915 0495 || <https://videoconf-colibri.zoom.us/j/85289150495>

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More information about the GGD group and seminars in [gravitation.web.ua.pt](http://gravitation.web.ua.pt)

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