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

Gravitational Geometry and Dynamics Group Seminar

Wed. 22nd March '23 Online at 11h00

Numerical convergence of model Cauchy-Characteristic Extraction and Matching

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Zoom meeting ID 962 2413 8340

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The detection of gravitational waves is a powerful tool in our quest to deepen our understanding of fundamental physics. To make the most out of this tool, we need to accurately simulate the whole process of gravitational wave emission, propagation, and detection by interferometers. The methods of Cauchy-Characteristic Extraction (CCE), and Matching (CCM) have the potential to provide highly accurate gravitational waveform models. In reaching this potential there is a subtle obstacle that has been overlooked. This obstacle is the weakly hyperbolic structure of the PDE system solved in the Characteristic setup of the Einstein Field Equations (EFE), which results from the common choice of Bondi-like coordinates. Motivated by this, I will discuss toy models that capture that PDE structure and study CCE and CCM with them. More specifically, I will present norm convergence tests that demonstrate the effect of weak hyperbolicity in model CCE and CCM and discuss how these results relate to CCE and CCM for the EFE.

https://videoconfcolibri.zoom.us/j/96224138340?pwd=YkZUMGlLb0dqVjcxOVpXMTFVMTBXQT09

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The Gr@v seminars are supported in part by the FCT - Portuguese Foundation for Science and Technology, through CIDMA - Center for Research and Development in Mathematics and Applications, within project UIDB/04106/2020 and UIDP/04106/2020

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