INSTITUTO TECNOLÓGICO AUTÓNOMO DE MÉXICO

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Seminario Aleatorio

Sesión 410

Flexible and Efficient Simulation of Spatio-Temporal Processes with Advection

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Abstract

Traveling phenomena are prevalent in a variety of fields, from atmospheric science to seismography and oceanography. However, there are two main shortcomings in the current literature: the lack of realistic modeling tools and the prohibitive computational costs for grid resolutions useful for data applications. We propose a flexible simulation method for traveling phenomena. To our knowledge, ours is the first method that is able to simulate extensions of the classical frozen field, which only involves one deterministic velocity, to a combination of velocities with random components, either in translation, rotation or both, as well as to velocity fields point- wise varying with space and time. We study extensions of the frozen field by relaxing constraints on its spectrum as well, giving rise to still stationary but more realistic traveling phenomena. Moreover, our proposed method is characterized by a lower computational complexity than the one required for circulant embedding, one of the most commonly employed simulation methods for Gaussian random fields, in R^{2+1}.

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salón: 301, ITAM Campus Río Hondo

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El Seminario Aleatorio del Departamento de Estadística del ITAM está destinado tanto a profesores como a estudiantes, por lo que se agradece a los profesores que colaboren invitando a sus alumnos a estas sesiones.