UNICAMP – IMECC
Departamento de Matemática

Seminário de Sistemas Dinâmicos e Estocásticos

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Título: Approximations using generalized Haar systems

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Resumo. H-systems [Gundy 1966], a generalization of Haar wavelets basis, are orthonormal systems $\{u_k\}$ such that, for a given $X \in L^2(\Omega, \mathcal{A}, P)$, its conditional expectation with respect to $\sigma(u_0, \ldots, u_n)$ is given by:

$$\mathbf{E}(X|u_0, \ldots, u_n) = \sum_{k \geq 0}^{n} < X, u_k > u_k \qquad n \geq 0.$$

H-systems allow for efficient approximation of random variables with appropriate conditions. They can also be used for pathwise approximation of stochastic processes with continuous paths, in this case space-time discretizations (introduced by Willinger) are required. We will characterize H-systems in terms of sequences of partitions. This characterization allow us to construct H-systems, and provides a Multiresolution Analysis structure which gives an algorithm for analysis, compression and reconstruction (synthesis) in a similar way to classical wavelets. We will also describe some applications.

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