



Próximo Seminario DMAT

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Sala de Seminarios, DEPARTAMENTO DE MATEMÁTICA

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High-order filtered schemes for time-dependent second order Hamilton-Jacobi-Bellman equations

In this work, we present and analyse a class of ‘filtered’ numerical schemes for second order Hamilton-Jacobi-Bellman equations. Our approach follows the ideas recently introduced in B.D. Froese and A.M. Oberman, *Convergent filtered schemes for the Monge-Ampère partial differential equation* (SIAM J. Numer. Anal., 2013) and more recently applied by other authors to stationary or time-dependent first order Hamilton-Jacobi equations.

For high order approximation schemes (where ‘high’ stands for greater than one), the inevitable loss of monotonicity prevents the use of the classical theoretical results for convergence to viscosity solutions. The work introduces a suitable local modification of these schemes by ‘filtering’ them with a monotone scheme, such that they can be proven convergent and still show an overall high order behavior for smooth enough solutions.

We give theoretical proofs of these claims and illustrate the behavior with numerical tests from mathematical finance, focusing also on the use of backward differencing formulae for constructing the high order schemes.