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Stanley Osher is a Professor of Mathematics, Computer Science, Chemical Engineering and Electrical Engineering at UCLA. He is also an Associate Director of the NSF-funded Institute for Pure and Applied Mathematics at UCLA. He received his MS and PhD degrees in Mathematics from the Courant Institute of NYU. Before joining the faculty at UCLA in 1977, he taught at SUNY Stony Brook, becoming professor in 1975. Professor Osher is one of the most highly cited researchers in both mathematics and computer sciences with an h index of 100(according to google scholar). In recent years he has averaged one citation per hour. He has received numerous academic honors and co-founded three successful companies, each based largely on his own (joint) research.
He has co-invented and/or co-developed the following widely used algorithms:

1. Essentially nonoscillatory (ENO), weighted essentially nonoscillatory (WENO) and other shock capturing schemes for hyperbolic systems of conservation laws and their analogues for Hamilton-Jacobi equations;
2. The level set method for capturing dynamic surface evolution;
3. Total variation and other partial differential based methods for image processing;
4. Bregman iterative methods for L1 and related regularized problems which arise in compressive sensing, matrix completion, imaging and elsewhere;
5. Diffusion generated motion by mean curvature and other threshold dynamics methods.

Professor Osher has been elected to the US National Academy of Science and the American Academy of Arts and Sciences. He was awarded the SIAM Pioneer Prize at the 2003 ICIAM conference and the Ralph E. Kleinman Prize in 2005. He was awarded honorary doctoral degrees by ENS Cachan, France, in 2006 and by Hong Kong Baptist University in 2009. He is a SIAM and AMS Fellow. He gave a one hour plenary address at the 2010 International Conference of Mathematicians. He also gave the John von Neumann Lecture at the SIAM 2013 annual meeting. He is a Thomson-Reuters highly cited researcher-among the top 1% from 2002-2012 in both Mathematics and Computer Science. In 2014 he received the Carl Friedrich Gauss Prize from the International Mathematics Union-this is regarded as the highest prize in applied mathematics. His current interests involve information science which includes optimization, image processing, compressed sensing and machine learning and applications of these techniques to the equations of physics, engineering and elsewhere.

Overcoming the Curse of Dimensionality for Certain Hamilton-Jacobi (HJ) Equations Arising in Control Theory and Elsewhere

Abstract
It is well known that certain HJ PDE's play an important role in analyzing continuous dynamic games and control theory problems. The cost of standard algorithms, and, in fact all PDE grid based approsimations is exponential in the space dimension and time, with huge memory requirements. Here we propose and test methods for solving a large class of HJ PDE relevant to optimal control without the use of grids or numerical approximations. Rather we use rhe classical Hopf formulas for solving initial value problems for HJ PDE. We have noticed that if the Hamiltonian is convex and positively homogeneous of degree one that very fast methods (related to those used in compressed sensing) exist to solve the resulting optimization problem. We seem to obtain methods which are polynomial in dimension. We can evaluate the solution in very high dimensions in between 10^{-4} and 10^{-8} seconds per evaluation on a laptop. The method requires very limited memory and is almost perfectly parallelizable. In addition, as a step often needed in this procedure, we have developed a new and equally fast and efficient method to find, in very high dimensions, the projection of a point exterior to a compact set A onto A. We can also compute the distance to such sets much faster than fast marching or fast sweeping algorithms. The term "curse of dimensionality" was coined by Richard Bellman in 1957 when he did his pioneering work on dynamic optimization.