Department of Mathematics University of Houston

Seminar on Computational Mathematics in Oil & Gas Exploration and Imaging

Dr. Andrei Davydychev Schlumberger

Physics and Mathematics in Search for Oil: How to Extract Formation Conductivity and Other Parameters

Tuesday, February 23, 2016 1:30 PM – 2:30 PM Room 646 PGH

Abstract: This is an overview of some physical applications and mathematical techniques which are employed when designing tools and interpreting measurements used in the search for oil. To determine whether one can find oil or gas at a certain depth of the drilled well, one can use measurements of a number of downhole tools, based on different physical principles - electromagnetism (EM), nuclear physics, sonic/acoustic waves, nuclear magnetic resonance (NMR), sampling and pressure, etc. Formation properties may be rather complicated, so one needs to use inversion techniques (Gauss-Newton, Monte-Carlo, etc.) to get the corresponding parameters: for example, the conductivities of the layers, anisotropies, formation dip, borehole properties, etc. Some of the existing tools and techniques used in formation evaluation are described.