

## Asymptotic ray theory applied to pressure fields in a marine environment

\*Adam M. Baig (University of Alberta) and Dr. Frantisek Hron (University of Alberta)

Asymptotic ray theory has become a standard tool in the oil industry for seismic modeling. Traditionally, vector displacements due to seismic waves are modeled via this approach. However, in a marine environment, this tactic is not feasible. Instead, the pressure field has been computed with the aid of A.R.T. applied to the scalar wave equation. The theory for higher order ray approximations for quantities propagating via the scalar wave equation is developed. In general, it may be shown that an infinite number of asymptotically converging higher order terms in the near field will contribute to non-geometric effects. However, for some special cases, only a few of these terms will be non-zero. Such is the case in homogenous media, where the zeroth order approximation perfectly describes the amplitudes observed along the ray. This may be shown through comparison of the ray theoretical solution with that of the well-known result of D'Alembert.