5007-86-171 **Anibal Sosa*** (uasosa@icesi.edu.co), **Aaron Velasco** and **Lennox Thompson**. *Constrained optimization framework for geophysical inversion of seismic data.*

Many experimental techniques in geophysics advance the understanding of Earth processes by studying Earth velocity structure. We present a novel approach based on constrained optimization, to expand a one dimensional (1-D) joint inversion least-squares algorithm to characterize Earth's structure. We use multiple geophysical data sets with different sensitivity and resolution domains to produce 1-D velocity models.

Our non-standard approach poses the inversion problem as in nonlinear programming that we solve by means of primal-dual interior point methods. To address some of the numerical issues inherently related to these inversion problems, we use inequality constraints to introduce physical bounds over the parameters. Our synthetic and real data tests show that the addition of this type of constraints, can be considered as a robust alternative to introduce a priori information. Furthermore, we present a framework that produces 3-D velocity models by using a kriging interpolation scheme to combine independent 1-D velocity models. Our smoothly varying 3-D results compared to those obtained by other techniques facilitate their interpretation. Finally, we discuss advantages/disadvantages of our approach, compare our findings with previous work and explore further research areas (Received May 04, 2013)