

## HIGH ORDER APPROXIMATION OF THE 2D ACOUSTIC WAVE EQUATION IN A MEDIUM WITH VERTICAL POLAR ANISOTROPY USING FINITE DIFFERENCES

Jairo A. Torres<sup>a</sup>, Yesid Goyes<sup>b</sup>, Gustavo Chacon<sup>b</sup> and Henry F. Cabrera<sup>a</sup>

<sup>a</sup>*University of Pamplona, Colombia, jatorresp@gmail.com*

<sup>b</sup>*Universidad Industrial de Santander, Colombia, goyes.yesid@gmail.com*

**Abstract.** This paper presents a numerical approximation of the wave equation for anisotropic acoustic medium. The type of anisotropy considered is called in the oil industry as VTI anisotropy or anisotropy polar vertical; it represents a configuration of layers of sedimentary rocks deposited subhorizontal. The purpose of this study was to evaluate different orders of approximation of the partial derivatives in time and space, evacuating the wave field generated by numerical modeling, obtains synthetic seismograms for different orders of approximation. Finally we present the benefits of using finite difference numerical schemes of high order for this type of differential equation, numerical schemes developed here have stable conditions in space and time, there are differences with respect to computational cost and response when building geological models which are considered types of sedimentary rocks.