1086-35-331 **Ranis N Ibragimov*** (ranis.ibragimov@utb.edu), Brownsville, TX 78520. *Mathematical Modeling of Hurricanes and Atmospheric & Oceanic Whirlpools by Means of Linear and Nonlinear Internal Kelvin Waves Confined in Cylindrical Basins.*

The effects of the Earth's rotation on three dimensional stratified fluids confined in a rigid cylindrical basin were examined analytically and numerically. The time series of the energy density were visualized as spinning patterns that appear to be rotating in an anticlockwise sense when looking from above the North Pole. Such spinning patterns were compared with the flow around a low-pressure area that is usually being linked with a modeling of hurricanes. The exact solutions to the nonlinear model are found by means of approximate transformation groups of equations with a small parameter. Introduction of the small parameter has been motivated by justifying the analogy of the Kelvin hypothesis on the velocity component normal to a wall vanishing throughout the domain. One of the invariant solutions was visualized as funnels having something in common with the geometric structure of oceanic whirlpools. The deep-water whirlpools - part of the ocean's complex circulatory system, help drive the ocean currents that moderate Earth's climate. These whirlpools play a key role in global climate as well, transporting ocean heat from the equator northward and eventually feeding into the Gulf Stream system. The natural phenomenon, which creates the whirlpools, is unknown to modern science. (Received August 21, 2012)