1145-76-1675 **Dania Sheaib*** (dania.sheaib@ou.edu). *Linear Stability Analysis of a Hydrodynamic Problem in the Absence of Dissipation.*

Our interest in hydrodynamic problems stems from modeling the turbulent flow found in the atmosphere and studying the onset of convective patterns caused mainly by the interactions of solar radiation with the Earth's surface. One of the most studied convection phenomena is the Rayleigh-Benard convection occurring in a fluid placed between horizontal parallel plates in the gravitational field in which a temperature gradient is always maintained. The literature shows that when the temperature difference across the fluid exceeds a critical value, the rest state becomes unstable and the fluid breaks into convective flow cells that occur periodically in space. Although our problem seems very similar to the Rayleigh-Benard setting, mathematical and numerical results show that in the absence of dissipation the model is stable and the fluid is incapable of producing convective patterns no matter how much we increase the temperature of the bottom plate. In this talk, we will describe the governing equations and boundary conditions and explain how they differ from the Rayleigh-Benard set up. Then we will present mathematical results concerning the linear stability analysis of the problem and as time permits introduce a numerical approach that helped us build intuition about our problem. (Received September 23, 2018)