**Department of Mathematics and Statistics Colloquium**

# Efficient and Accurate Numerical Schemes for Long Time Statistical Properties of the Infinite Prandtl Number Model for Convection

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Abstract: In our work we analyze and implement numerical schemes for the infinite Prandtl number model for convection. This model describes the convection that is a potential driving force behind the flow and temperature of the Earth's mantle. There have been many results with the purpose of estimating the scaling of the Nusselt number, which is viewed as a long time statistical quantity. Of the many numerical schemes available, very few are analytically investigated for their ability to adequately capture the long time statistical properties of the model, and are instead compared to other available experimental and numerical results. Through analysis we show that our schemes fall into the class of "uniformly dissipative" schemes and have the potential to actually capture long time statistics of the infinite Prandtl number model. We further show numerically that our schemes align with current knowledge of the model's characteristics at Rayleigh numbers below the threshold for hard turbulence.

**Monday, October 26 at 3:45 in Roop 103**

**refreshments at 3:30**