

## Parametric Interpolation Framework for 1-D Scalar Conservation Laws

Dr. Geoffrey McGregor<sup>1</sup>

Conservation laws are fundamental first order partial differential equations which describe transport phenomena in fields such as fluid dynamics, meteorology and traffic flow modelling. Even in their simplest form, conservation laws are difficult to study numerically due to discontinuities (shocks) which may form in the solution. Applying standard high-order methods in a neighbourhood of these discontinuities creates instabilities, forcing most methods to utilize low-order stable schemes near shocks. In this talk I will introduce a novel conservative parametric interpolation framework and show how it can be utilized to solve 1-D scalar conservation laws. The resulting framework extracts discontinuous solutions through an area-preserving projection and tracks shocks to high-order, while remaining high-order elsewhere in the domain of computation. In this talk I will present both the homogeneous and the non-homogeneous cases and include numerical results for the non-homogeneous convex and homogeneous non-convex cases.

---

<sup>1</sup>Department of Mathematics and Statistics, University of Northern British Columbia, Prince George, B.C., V2N4Z9, Canada (geoffrey.mcgregor@unbc.ca).