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**April K Tran\*** ([chitran17@augustana.edu](mailto:chitran17@augustana.edu)), 628 42nd Street, Rock Island, IL 61201. *On the Stability of the Alternative Finite Difference Schemes*. Preliminary report.

While the well-researched Finite Difference Method (FDM) discretizes every independent variable into algebraic equations, Method of Lines discretizes all but one dimension, leaving an Ordinary Differential Equation (ODE) in the remaining dimension. That way, ODE's numerical methods can be applied to solve Partial Differential Equations (PDEs). In this project, Linear Multistep Methods and Method of Lines are used to numerically solve the Heat Equation. Specifically, the Adams-Bashforth method, Adams-Moulton method, and Backward Differentiation Formulas are implemented as the Alternative Finite Difference Schemes. Additionally, I examine their Region of Stability using the extended version of Von Neumann Stability Analysis for multiple timesteps. (Received September 15, 2020)