# Chapter 3

# Numerical Methods

## 3.1 Stability Theory

Some common approaches are (1) explicit schemes–these are generally easy to code and run very efficiently, (2) implicit schemes–highly admired for their stability characteristics, but to code and computationally expensive to solve. Note that both approaches have violate CFL at one-sided computational domains. (3) angled-schemes–have proven useful when applied downwind of convection terms. (4) ad hoc schemes–this involves a variety of psuedo-boundary conditions, such as physical conditions like outgoing-radiation conditions which give additional constraining equations, asymptotic solutions, sponge-filters, causal boundary conditions which try to repair CFL, and many other creative approaches.

## 3.2 Some Model Problems

## 3.3 Implications for Singular Spacetime Grids