# Linearized General Relativity in Hyperboloidal Coordinates
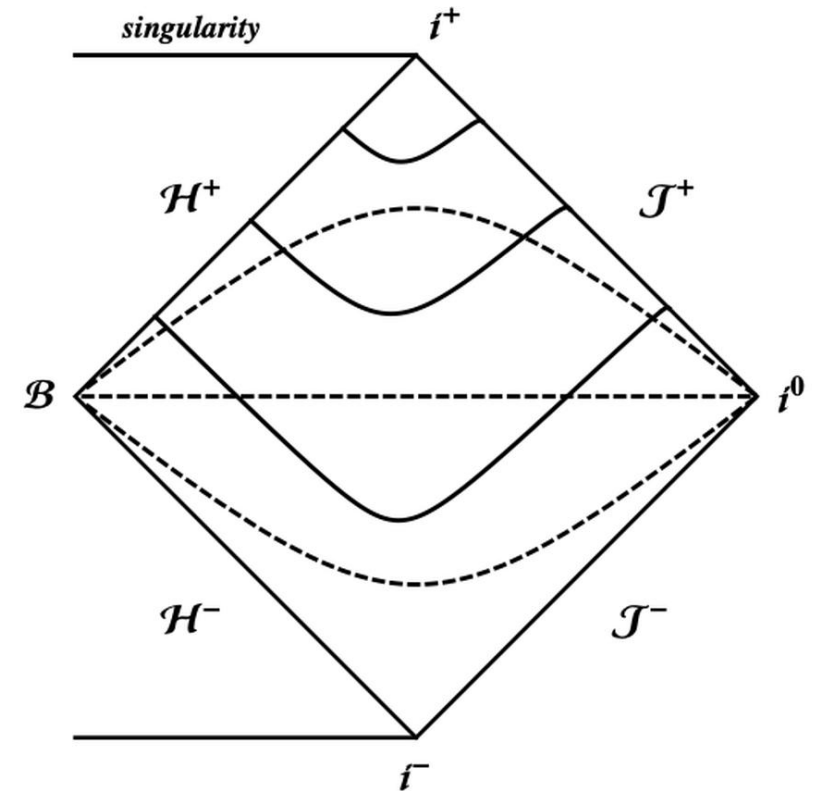
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# Studying Gravitational Waves Numerically

- Study gravitational waves from the **POV of the source**
  - **Asymptotically flat space**
  - We are **infinitely far away**
  - **No incoming waves** in our system

- Compactifying spacetime is useful
  - (if propagation speed stays finite)

- GR is too complicated
  - Harmonic gauge is **very similar to a wave equation**
  - Wave equations sound like a great place to start

# Riding The Waves to GR



Wave Equation in 1+1

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Wave Equation in 3+1 (Spherical)

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Cubic Wave Equation

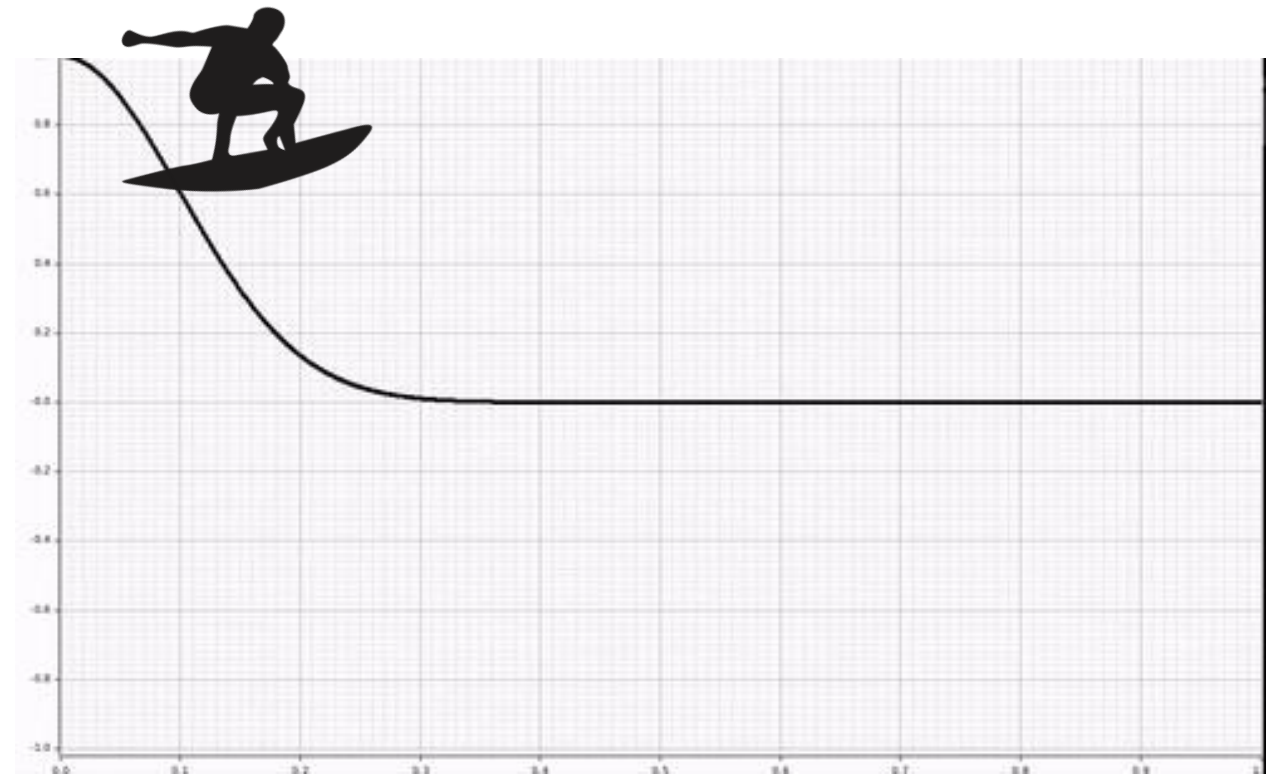↓

Wave Equation with Quadratic Non-Linearity

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Good-Bad-Ugly-F Model → ??????? → General Relativity

# Following Up With The Thesis

- Expand the well-established NR code **BAMPS**
  - Swap finite differences for pseudo-spectral

- Continue our **journey towards GR**
  - Study more non-linearities of the wave equation
  - Study toy models of GR