

Chapter XVII

General Relativity

17.1 Introduction.

17.2 The construction of the general relativistic field equations.

We are interested in the general relativistic field equations together with the Einstein antigravity, or Λ , term. Observationally the Λ term is present.

17.3 The field equations as projections.

17.4 The stress-energy tensor.

17.5 Eigenvalues of the field equations.

The general relativistic field equations are matrix equations. But from any matrix equation there can be derived its scalar analogue, an eigenvalue equation.

We will discuss these eigenvalues, including for the Λ term, and compare this theory with Brans-Dicke scalar gravity.

17.6 The propagation of gravitational waves through matter.

Just as light waves are refracted on entry to a denser transparent medium, the question arises as to whether there is a corresponding effect as gravitational waves propagate through bulk matter, such as the Earth.