

Gravitational waves — Exercise sheet n.2

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Exercise 2.1: Linearized Einstein equations

Compute the Einstein tensor $G_{\mu\nu}$ and the Riemann tensor $R^\mu{}_{\nu\rho\sigma}$ in weak field approximation,

$$g_{\mu\nu} = \eta_{\mu\nu} + h_{\mu\nu} + O(h^2). \quad (1)$$

Exercise 2.2: Effect of GWs

Consider two point-particles test-masses in a locally-flat spacetime (typically labeled as *detector frame*). Show explicitly that the effects of GWs can be described in terms of a Newtonian force at the leading order.