DEFINITION OF INERTIAL GRAVITATIONAL RADIATION

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The tetrad treatment of the general theory of relativity has been used in the following representation of gravitational inertial radiation. Near point x in space-time there exists radiation if

$$(G_i G^i - I_i I^i)(x) = 0,\ (G_i I^i)(x) = 0,\ G_i(x) \neq 0,\ I_i(x) \neq 0,$$

where

$$G^i = -c^2 h^{i(s)} h^{\kappa}_{(s);\kappa},\ I^i = \frac{c^2}{2} h^i_{(a)} \varepsilon^{(jpma)} h^t_{(p)} \frac{\partial h_{(j)t}}{\partial x^\kappa} h^t_{(p)} \frac{\partial h_{(j)}{}^t}{\partial x^\kappa} h^\kappa_{(m)}.$$

Here $h^i_{(a)}$ denotes vector a of the tetrad, while $\varepsilon^{(ipla)}$ is the Levi–Civita symbol in the special theory of relativity.

It is shown that this definition is largely analogous to the definition of radiation in the electrodynamics The quantities G_i and I_i incorporate the interaction of a fermion with the gravitational field. This follows also from an analysis of Dirac's equation.

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