on the equivalence of fields of acceleration and gravity

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Abstract

The question of whether the same acceleration eld that is found in a rigid uniformly rotating disc can annul a gravitational eld is answered in the negative because their curvatures are dierent. There is an exact correspondence between a uniformly rotating disc and hyperbolic geometry of constant curvature, while, gravitational elds require non-constant, negative curvature. The connection between the two is the free-fall time; the former has constant density while the latter, constant mass. The distortion caused by motion is experienced in the hyperbolic world when the rim of the -disc is approached, where is the disc radius that determines the nature of the elds. Characteristic hyperbolic properties can thus be used to explain relativistic phenomena, like the angle defect in relation to the FitzGerald-Lorentz contraction, the electromagnetic Poincare stress, aberration which violates of the laws of cosines and sines, gravitational frequency shifts and the bending of light near a massive object.

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