

Spacetime singularities as sources of a conserved gravitational flux

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Spacetime singularities are regarded as sources or sinks of a conserved gravitational flux. The flux lines are viewed as curves belonging, not to the spacetime manifold M , but to the tangent fibre bundle over M . These lines are determined by timelike and null geodesics referred to a suitable nonaffine parameter. With the help of this approach to the study of singularities a simple proof is given of Penrose's theorem on the occurrence of a singularity in a star undergoing asymmetric gravitational collapse.