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SPACE-TIME DISTRIBUTIONS

Mihaela D. Iftime

Abstract. The space-time foliation Σ compatible with the gravitational field g on a 4-manifold M determines a fibration π of M, $\pi : M \longrightarrow N$ is surjective submersion over the 1-dimensional leaves space N. M is then written as a disjoint union of the leaves of Σ, which are 3-dimensional spacelike surfaces on M.

The decomposition, $TM = \Sigma \oplus T^0M$, also implies that we can define a lift of the curves on N to curves (non-spacelike) on M.

The stable causality condition holds on M means that Σ is a causal space-time distribution, generated by an exact timelike 1-form $\omega^0 = dt$ where t is some real function on M. In this case M is written as a disjoint union of a family of spacelike 3-surfaces of constant t, which cover $D^+(S)$ of a initial 3-surface S of M.

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E-mail: xxxxxxxxxxxxxxxxxx