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Linear Connections on Light-like Manifolds

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Abstract: It is well-known that a torsion-free linear connection on a light-like manifold (M, g) compatible with the degenerate metric g exists if and only if $\text{Rad}(TM)$ is a Killing distribution. In case of existence, there is an infinitude of connections with none distinguished. We propose a method to single out connections with the help of a special set of 1-forms by the condition that the 1-forms become parallel with respect to this connection. Such sets of 1-forms could be regarded as an additional structure imposed upon the light-like manifold. We consider also connections with torsion and with non-metricity on light-like manifolds.

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