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TT tensors in flat spaces of any dimension

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Traceless tensors with vanishing divergence (TT tensors) play a big role in the initial value problem in general relativity. They are solutions of the momentum constraints which can be extended to solutions of the full system of constraints by means of the conformal method of Lichnerowicz. First, we describe all divergence-free tensors T in flat spaces in terms of potentials which form a four index tensor R with all algebraic symmetries of the Riemann tensor. This tensor admits a big group of gauge transformations which can be used to simplify it. If T is traceless then we can choose R to be traceless too, so it has all properties of the Weyl tensor. Still it can be further reduced by means of gauge transformations.

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