

Bianchi derivative characterization of Lovelock polynomial

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It is well known that the trace of Bianchi derivative of Riemann curvature yields the second rank symmetric (Einstein) tensor with vanishing divergence which is exactly what one obtains on variation of Einstein Hilbert action, the trace of Riemann (scalar curvature). We identify the fourth rank tensor which is a homogeneous polynomial in Riemann and the trace of its Bianchi derivative gives the analogous divergence free tensor which follows from variation of Lovelock action. This is a new characterization of Lovelock polynomial.