New Abel differential equations in Einstein Gauss Bonnet gravit

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Abstract

We investigate static, spherically symmetric solutions of second order Lovelock (Einstein–Gauss–Bonnet) gravity in N-dimensional spacetime. The field equations are considered for both charged and neutral fluids. Under the assumptions of a static, spherically symmetric spacetime, the field equations reduce to a system of nonlinear differential equations, with the condition of pressure isotropy providing the equation governing the metric potentials. We investigate the integrability of the condition of pressure isotropy and obtain exact solutions for the resulting differential equation. Our results demonstrate how the higher order curvature corrections of Lovelock gravity modify the structure and integrability of the condition of pressure isotropy in higher dimensions.

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