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The Study of the Canonical Forms of the Killing Tensor in the frame of General Theory of Relativity

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There are various ways to deploy symmetries in order to extract exact solutions of Einstein's Field Equations. The Study of the Canonical forms of Killing Tensor in the frame of General Theory of Relativity proved fruitful in the past providing new solutions or general families of already known spacetimes. Regarding the latter the most general versions of Killing Tensor, its four Canonical Forms are employed for this purpose.

This work concerns the simultaneous resolving of the Integrability Conditions of the 2nd and 3rd Killing Tensor along with the Einstein's Field Equations using the framework of Newman-Penrose Formalism. We present all the Petrov Types that admit these Canonical Forms in Vacuum. Our interesting focuses on type D solutions bringing to surface the Carter's Case [D].

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