

Generating Solutions of Einstein's Field Equations by Typing Mistakes

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A solution to Einstein's field equations is presented that represents a Petrov type II electromagnetic null field with one Killing vector. This solution generalizes a vacuum solution previously discovered by Hoenselaers. The solution was found by the peculiar method of generalizing a member of this class inadvertently discovered by making a typing error when checking the vacuum solution with the computer algebra system SHEEP.

1. INTRODUCTION

In a previous paper [1], one of the authors developed a method of classifying solutions to Einstein's equations that admit only one Killing vector. In a further paper [2], this scheme was used as the basis for obtaining that particular subclass of such solutions for which the Ricci tensor has a double null and a spacelike eigenvector. The resulting metric for this family takes the form

$$ds^2 = e^{-l} \left\{ 2d\omega \left(dr - m d\omega - \frac{n}{f} dl \right) + \frac{dl^2}{f^2} \right\} + e^l (dz + \eta_1 d\omega + \omega dl)^2 \quad (1)$$

where

$$f(l, \omega) = e^{-l} (Ae^l + B)^2 \quad (2a)$$

$$m(l, r, \omega) = \frac{1}{2} ABfr^2 - \delta r + m_1 \quad (2b)$$

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