

EINSTEIN EQUATIONS IN THE CASE OF STATIC  
CYLINDRICAL SYMMETRY AND THE DIAGONAL  
STRESS-ENERGY TENSOR WITH MUTUALLY  
PROPORTIONAL COMPONENTS

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S u m m a r y

The Einstein equations with the stress-energy tensor in the form of a diagonal matrix with mutually proportional components are studied in the static cylindrically symmetric case. Several known exact solutions fall into this case (static electric field, some perfect fluid solutions, and solution with the cosmological constant). Coefficients of proportionality in the stress-energy tensor serve as parameters that allow studying a more general case (as well as obtaining new solutions for particular values of these coefficients). The initial system of equations is simplified and transformed into a system of two first-order ordinary differential equations. An exact solution is found for a broad set of parameters. The equilibrium points of the system of equations are considered, and the qualitative behavior of the solutions near the hyperbolic equilibrium points is studied.