

A SYMMETRY ANALYSIS OF LINEAR DIFFERENTIAL EQUATIONS

Robuk V.N.

Joint institute for nuclear research
Laboratory of information technologies
Russia, 141980, Dubna, Moscow region,
Phone: +74962163608, E-mail: Victor.Robuk@jinr.ru

A general formula has been received for an explicit expression of operators of symmetry of the linear homogeneous differential equations in partial derivatives with constant complex coefficients. By an example of the equation of hyperbolic type

$$\frac{\partial U}{\partial t} = a_1 \frac{\partial^2 U}{\partial x^2} + a_2 \frac{\partial^2 U}{\partial y^2} + a_3 \frac{\partial^2 U}{\partial z^2}$$

the advantages of the symmetry analysis are shown. In particular, a new class of analytical solutions to this equation has been constructed. The presence of 20 arbitrary independent parameters in these solutions allows one to find a number of interesting properties of the behavior of the located quasi-stable states in models of heat-and-mass transfer, quantum mechanics, etc.