Explicit solutions of the differential systems and mathematical modelling in electrodynamics

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Several new analytic methods are proposed here basing on the diagonalization procedure for arbitrary square system of PDEs (partial differential equations) with the piecewise constant coefficients. Engineering applications are done in terms of the boundary value problems regarding the general wave PDE included all scalar components of the electromagnetic field vector intensities.

Those mentioned results are inspired and supported by [1] - [8]. The tentative constructive generalizations and relevant computer simulations are based on [9].
The outline of research is the following:

1 Introduction: The classical and modern trends in the electromagnetic field theory.

2 Main constructive results: Two new diagonalizing procedures for the systems of PDEs and their applications to the mathematical modelling in electrodynamics.

3 Discretization scheme: Numerical implementation and computer simulation of the relevant electromagnetic engineering problems.

4 Conclusions: Specific features of the proposed analytic techniques.

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