

# Aplikace matematiky

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## Summaries of Papers Appearing in this Issue

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JÁN PIDANY, Košice: *O možnosti riešenia sústavy rovníc nomogramami s orientovaným transparentom.* (On the possibility of representation of a system of equations by nomograms with oriented transparency.) *Apl. mat.* 14 (1969), 298—307. (Original paper.)

This paper examines necessary and sufficient conditions under which a system of two equations with eight variables and a system of four equations with twelve variables can be transformed into the basic canonical forms represented by nomograms with oriented transparency.

ROSTISLAV ZEZULA, Praha: *Onedimensional homogenized reactor with natural uranium and with flattened specific output.* *Apl. mat.* 14 (1969), 323—336. (Original paper.)

The problem of flattening the reactor specific output for the case of homogenized thermal critical reactor fueled with natural uranium is mathematically formulated (in the two-groups diffusion approximation and for onedimensional geometries) in the article. It is shown that this problem leads to a quasilinear biharmonic Cauchy's problem having a twoparametrical family of solutions  $N(x; N_0, N_0'')$ . The existence and stability of these solutions and the possibility of the optimization of the total reactor output by a proper choice of the parameters  $N_0, N_0''$  is investigated.

## SUMMARIES OF PAPERS APPEARING IN THIS ISSUE

(These summaries may be reproduced)

JOZEF KLIMČÍK, Košice: *Riešenie niektorých technických problémov pomocou kótovane-vektorovej zobrazovacej metódy v  ${}^4P$ .* (Solution of some engineering problems by dimensional vector representation method in  ${}^4P$ .) Apl. mat. 14 (1969), 259—277. (Original paper.)

The first two sections of this work deal with the principles of the dimensional vector representation method in the Euclidean four-dimensional linear space  ${}^4P$ . Graphical solutions of elementary tasks needed in this paper are given. The further sections of this paper bring forward solutions of some crystallographic, chemical and mine surveying problems, e.g. assigning of silicates to the group of silicates-montmorillonites, determination of the percentage content of components of the resulting chemical systems with two, three, four and five components, drawing a diagram of a vein metal content, etc.

IVAN HLAVÁČEK, Praha: *Variational principles for parabolic equations.* Apl. mat. 14 (1969), 273—297. (Survey paper.)

New types of variational principles, each of them equivalent to the linear mixed problem for parabolic equation with initial and combined boundary conditions having been suggested by physicists, are discussed. Though the approach used here is purely mathematical so that it makes possible application to all mixed problems of mathematical physics with parabolic equations, only the example of heat conduction is used to show the physical interpretation. The principles under consideration are of two kinds. The first kind presents a variational characterization of the original problem, expressed in terms of a scalar function (temperature). The principles of the second kind characterize the same problem, formulated in terms of other variables, e.g. of a vector function (heat flux or entropy displacements).

LUMÍR VESELÝ, Brno: *Některé vlastnosti rozvoju veličin rotačně souměrného magnetického pole v okolí osy souměrnosti do mocninných řad a jejich souvislost s Legendrovými polynomy.* (Some properties of the power series expansions of the quantities describing axially symmetric magnetic field in a neighborhood of the axis of symmetry and their relation to the Legendre polynomials.) Apl. mat. 14 (1969), 308—322. (Original paper.)

In the paper two kinds of double expansions into power series for the scalar and vector potentials of an axially symmetric magnetic field in a neighborhood of the axis of symmetry are examined. Both kinds are identical and are in relation with the harmonic series expansions expressed by the Legendre polynomials.