

# Aplikace matematiky

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## Summaries of Papers Appearing in this Issue

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## SUMMARIES OF PAPERS APPEARING IN THIS ISSUE

(These summaries may be reproduced)

MARCEL JIŘINA, Praha: *Některé vlastnosti nelineárních obvodů a fyzikální význam jacobianů*. (Some properties of nonlinear circuits and a physical interpretation of Jacobian.) *Apl. mat.* 18 (1973), 77–82. (Original paper.)

A practical problem leads to the investigation of a system of equations in the form  $f(x, y, y', z) = 0$ . The well-known theorem on the solvability of the system of equations in the form  $f(x, y, y') = 0$  applies also to the above system. The condition that the Jacobian  $\mathbf{J} = \partial f / \partial (y', z)$  is nonzero is, under the corresponding assumptions, sufficient for the existence of a solution  $(y(x), z(x))$  of the system. Further the necessity of this condition is proved if the functions  $z(x)$  and  $y(x)$  are required to be respectively once and twice continuously differentiable. The presented theorem may be applied in mechanics as well as in the theory of electric circuits with concentrated parameters.

VĚRA RADOCHOVÁ, BRNO: *Numerical algorithm for the computation of the slip-line field*. *Apl. mat.* 18 (1973), 83–88. (Original paper.)

In this paper the slip-line field is studied for which two basic slip-lines, each of one family, are given. For this case the recurrence relations for a numerical algorithm of the slip-lines field computation are presented.

MIROSLAV ŠISLER, Praha: *Über die Konvergenz eines gewissen Iterationsverfahrens für zyklische Matrizen*. *Apl. mat.* 18 (1973), 89–98. (Original-artikel.)

In der Arbeit wird ein Iterationsverfahren für die Lösung eines linearen Gleichungssystems  $\mathbf{x} = \mathbf{B}\mathbf{x} + \mathbf{b}$  untersucht, wobei  $\mathbf{B}$  eine gewisse zyklische Matrix ist. Die Iterationsvorschrift ist von der Form  $\mathbf{x}_{v+1} = \mathbf{T}(\omega)\mathbf{x}_v + \mathbf{b}'$ , wo  $\mathbf{T}(\omega)$  eine von dem reellen Parameter  $\omega$  abhängige Matrix ist. Dabei ist  $\mathbf{T}(0) = \mathbf{B}$ . Es wird die Konvergenz dieses Iterationsverfahrens angesichts des Parameterwertes  $\omega$  untersucht.

JIŘÍ ANDĚL, Praha: *On interactions in contingency tables*. *Apl. mat.* 18 (1973), 99–109. (Original paper.)

Generalized logarithmic interactions are introduced and investigated in this paper. The theory is based on methods for multiple comparisons. A numerical example is given. A method based on logarithmic interactions is proposed for comparing several  $2 \times 2$  contingency tables.

ZBYNĚK ŠIDÁK, Praha: *A chain of inequalities for some types of multivariate distributions, with nine special cases.* Apl. mat. 18 (1973), 110–118. (Original paper.)

Generalizing the result by Y. L. Tong, a chain of inequalities for probabilities in some types of multivariate distributions is proved. These inequalities embrace a large number of interesting special cases. Nine illustrations are given: cases of multivariate equicorrelated normal,  $t$ ,  $\chi^2$ , Poisson, exponential distributions, normal and rank statistics for comparing many treatments with one control, order statistics used in estimating quantiles, and characteristic roots of covariance matrices in certain multiple sampling.

JINDŘICH NEČAS, Praha: *On the formulation of the traction problem for the flow theory of plasticity.* Apl. mat. 18 (1973), 119–127. (Original paper.)

An abstract ordinary differential equation with retarded argument is deduced as a model of incremental, rate independent strain theory. The concept of experience of material as well as some quantities characterizing the hardening of the material are introduced. The traction problem is considered, but neither the existence nor the uniqueness of the solution is proved. This remains an open problem.

ZBYNĚK ŠIDÁK, Praha: *On probabilities in certain multivariate distributions: their dependence on correlations.* Apl. mat. 18 (1973), 128–135. (Original paper.)

First, under a multivariate normal distribution with all correlations of the form  $\rho_{ij} = b_i b_j$  (where  $-1 \leq b_i, b_j \leq 1$ ), the probabilities of certain convex symmetric regions are shown to be, roughly speaking, non-decreasing functions of  $|\rho_{ij}|$ . Second, under an equicorrelated normal distribution, the probabilities of certain regions (which need be neither convex nor symmetric) are shown to be non-decreasing functions of the correlations. Third, some inequalities for special cases of multivariate exponential and Poisson distributions are given.