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MATHEMATICAL ASSOCIATION OF AMERICA

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APRIL MEETING OF THE IOWA SECTION

The fifty-second regular meeting of the Iowa Section of the MAA was held at the University of Dubuque on April 23, 1965. Chairman Robert V. Hogg presided. Total attendance was 89, including 49 members of the Association. Routine business was considered during the afternoon meeting.

A report of the Iowa 1965 high school mathematics contest was given. The contest is sponsored by the Des Moines Actuaries Club.

The following officers were elected: Chairman, Donald E. Sanderson, Iowa State University, Ames; Vice-Chairman, Charles M. Lindsay, Coe College, Cedar Rapids; Secretary-Treasurer, Earle L. Canfield, Drake University, Des Moines. The following papers completed the Program:

A report of the MAA Cooperative Summer Seminar of 1964, by E. R. Mullins, Jr., Grinnell College.

A report of the first MAA Cooperative Summer Seminar for college teachers of mathematics held at Cornell University, Ithaca, N. Y., for eight weeks in the summer of 1964. The purpose, the structure and the subject matter of the seminar are the essentials of the report.

Central automorphisms of a finite p-group, by A. D. Otto, State University of Iowa.

Suppose that G is a finite p-group. The order of the group $A_c(G)$ of central automorphisms of G is studied to help determine when the order of G divides the order of $A_c(G) \cap I(G)$, where $I(G)$ is the group of inner automorphisms. Attention is centered on those non-abelian p-groups which have no non-trivial abelian direct factors. For such a group G, $A_c(G)$ is a p-group and the order of $A_c(G)$ is between p^2 and p^{rs} where p^r is the order of the center and p^s is the order of the factor commutator group.

Function spaces of invertible spaces, by S. A. Naimpally, Iowa State University.

This will appear as a note in the MONTHLY.

Complete normality, The long line, and products, by D. E. Sanderson, Iowa State University.

The long line is completely normal (T_5) and its product with an interval, though not T_5, is surprisingly close to it. Any uncountable product of intervals contains a long line and a half-open interval which are mutually separated but have no disjoint neighborhoods. Thus, not only are subsets of such "cubes" the only source of spaces which are T_4 and not T_5, but such "cubes" are themselves examples—universal counterexamples, so to speak. The "zero-dimensional skeleton" of such a cube is not T_5 either. Hence no uncountable product of nondegenerate T_1-spaces is T_5.

Some problems in distribution theory, by A. T. Craig, University of Iowa (by invitation).

This paper reviews some of the history of distributions of functions of normally distributed variables and points out some unsolved problems.

Proof of an infinite series in tangents and cotangents, by A. W. Warrick and Don Kirkham, Iowa State University (presented by A. W. Warrick).

The identity

$$\theta \cot\theta + (1/3)\cot^3\theta[\tan\theta - \theta] - (1/5)\cot^5\theta[-(1/3)\tan^3\theta + \tan\theta - \theta] + \cdots = (1/8)(\pi^2 - 4\theta^2),$$
$$0 \leq |\theta| \leq \pi/2$$

is proved for $\pi/4 \leq |\theta| \leq \pi/2$. It was already known to be true for $0 \leq |\theta| \leq \pi/4$. A key substitution made was $y = \cot\theta$. This furnishes a missing proof for a problem of the MONTHLY, December 1964, pp. 1141–1142.

Some notes on teaching modern algebra to undergraduates, by Rev. J. C. Friedell, Loras College.

Loras College is currently offering two different levels of Modern Algebra, the first as an introduction for secondary teachers and applied science students, as well as for those intending to pursue graduate work in mathematics; the upper level is restricted to those planning to enter graduate mathematics.

To illustrate an idea in ring theory an example is constructed, with motivation, to show that the right and left distributive laws are independent axioms; this serves to distinguish in the students' minds the difference between the integers and an abstract ring. To focus attention on a basic problem in finite groups, an example is explained to show that the converse of Lagrange's Theorem is false.

Analog computer techniques for undergraduates, by J. H. McAllister, Monmouth College.

This paper consists of: (1) A brief summary of the components and capabilities of an analog computer and some elementary programming procedures as taught to undergraduates with a calculus and differential equations background; (2) the utilization of peripheral equipment including the oscilloscope, $X-Y$ plotter, servomultiplier, diode function generator, differential relay, and digital voltmeter; and (3) the determination of scale factors, generation of special functions, and the programming and solution of selected differential equations.

Stability of the combined predictor-corrector method for two backpoints, by R. E. Ohuche, Iowa State University, introduced by the Chairman.

Consider the first order ordinary differential equation

$$y' = f(x, y) \tag{1}$$

with the given initial condition $y(a) = p$. Frequently equation (1) is approximated by a linear difference equation which in turn is solved to obtain an approximate solution of equation (1).

This study considers predictor-corrector methods when two backpoints are involved. The idea of a practical region of stability, originally defined by Crane and Lambert, is introduced, and practical regions of stability are established for the combined predictor-corrector method.

A simple uniqueness theory for ordinary linear homogeneous differential equations, by L. E. Pursell, Grinnell College.

By applying the method of variation of parameters to the homogeneous differential equation $y'' + Py' + Qy = 0$, one can construct a proof of the uniqueness of the solution of the initial value problem which is simpler than those given in the various textbooks which the author has examined.

E. L. CANFIELD, *Secretary-Treasurer*