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October Meeting of the Indiana Section

P. T. Mielke (Secretary)

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Dean J. B. Davis, Amarillo College, has been appointed Dean Emeritus and Professor of Mathematics.

Dr. P. O. Frederickson, University of Nebraska, has been appointed Assistant Professor at Case Institute of Technology.

Mr. C. R. McAllister, Booz, Allen Applied Research, Inc., Los Angeles, California, has been promoted to Research Director in the Western Operations Office.

Assistant Professor J. R. McCarthy, College of the Holy Cross, is on leave during 1964–65 for special studies in statistics at the Catholic University of America.

Professor C. E. Miller, University of Saskatchewan, has been appointed Head of the Department of Mathematics.

Professor J. M. Perry, Clarkson College of Technology, is on leave during 1964–65 as a Visiting Member of the Institute for Fluid Dynamics and Applied Mathematics at the University of Maryland.

Associate Professor F. B. Taylor, Manhattan College, has been appointed Head of the Department of Mathematics.

Professor Emeritus B. A. Bernstein, University of California at Berkeley, died on September 25, 1964. He was a charter member of the Association.

Dr. D. F. Gunder, Loveland, Colorado, died on October 21, 1964. He was a member of the Association for 30 years.

Professor Emeritus R. G. Putnam, New York University, died on July 14, 1964. He was a member of the Association for 40 years.

MATHEMATICAL ASSOCIATION OF AMERICA

Official Reports and Communications

OCTOBER MEETING OF THE INDIANA SECTION

The Indiana Section met on Saturday, October 31, 1964, at Ball State Teachers College, Muncie. 125 persons attended of whom 60 were members of the Association. Chairman R. E. Dowds of Butler University presided. The morning was devoted to short papers and the afternoon to a business meeting and an invited hour address entitled "Experimental Methods in Number Theory" by Professor Hans Zassenhaus of the Ohio State University.

Papers presented at the morning session were:

1. *Two applications of stochastic processes to actuarial science*, by John A. Beekman, Ball State Teachers College.

Collective risk theory is discussed in terms of stochastic processes. The double Laplace transforms for the two major distribution functions are expressed as iterated integrals involving the characteristic function of the claim distribution. In non-insurance terms, the distribution functions are for the maximum of sums of random numbers of independent, identically distributed random variables, and for the probability that the random sums stay below a line. In insurance terms, the first distribution is for total claims, and the second is for the probability of ruin, for specified claim distribution, initial reserve, premiums and security loadings.

2. *Free topological groups*, by Robert L. Cooley, Wabash College.

The free topological groups $FM(X)$ and $FG(X)$ of Markov and Graev, respectively, are defined and shown to be different for a given completely regular space X. Results include the follow-

ing: If X is compact, then both $FM(X)$ and $FG(X)$ are normal and complete. X is discrete iff $FM(X)$ and $FG(X)$ are discrete. $FG(X)$ is connected iff X is connected, while $FM(X)$ is never connected. For a given space X, however, the abelian groups $AM(X)$ and $AG(X)$ are locally isomorphic.

$AM(X)$ and $FG(X)$ are factor groups of $FM(X)$; $AG(X)$ is a factor group of $FG(X)$ and of $AM(X)$. $S(Y)$, the subgroup generated in $FM(X)$ by Y, is equal to $FM(Y)$ iff Y is closed in X.

3. *A generalization of Buffon's needle problem*, by Rodney T. Hood, Franklin College.

A checkerboard of red and black squares, each of side S, is given. A needle of length S is dropped at random on the board. One endpoint of the needle is painted red, the other black. Then the probability that the colors at the endpoints will match their background is $1/\pi$. This variant of the Buffon needle problem is considered for its pedagogical value, along with related problems, and it is solved by a method which involves a wide variety of concepts and procedures from probability, geometry and calculus.

4. *A topological approach to geometry*, by Michael C. Gemignani, University of Notre Dame.

A structure G called a geometry is defined on a set X using distinguished subsets of X called k-flats. If X also has a topology T, and if G and T are properly related, then G can be used to characterize X as a space up to homeomorphism, that is, G can be used to express a complete set of purely topological invariants for X. This is done for R^m. The structure G can also be studied in its own right as an abstraction of almost anything mathematics has ever called a geometry.

5. *The summability of Fourier Series by Karamata methods*, by Vladeta Vuckovic, University of Notre Dame.

A sequence $\{s_\nu\}$ is K^λ—summable to s if $\Gamma(\lambda)\sum_{\nu=0}^{n}\binom{n}{\nu}\lambda^\nu s_\nu/\Gamma(\lambda+n)\to s$ as $n\to\infty$. The numbers $\binom{n}{\nu}$ are defined by $x(x+1)\cdots(x+n-1)=\sum_{\nu=0}^{n}\binom{n}{\nu}x^\nu$. For measurable and bounded periodic function f with period 2π define $w(t)=f(x+t)+f(x-t)-2f(x)$. The author proves the theorem: *If* $w(t)=o(1/\log(1/t))$ as $t\to+0$, then the Fourier Series of f is K^λ—summable at the point x to $f(x)$ for every $\lambda>0$.

6. *Some aspects of the convergence of series*, by G. R. MacLane, Purdue University.

One of the more difficult points in a course in elementary analysis is to induce an adequate understanding of convergence and divergence of infinite series. We are all familiar with the student who insists that any series whose terms tend to zero converges; also the one who is ensnared by the beauty of the ratio test and insists on applying it to every series under the sun. The writer has found that some students are helped to a better understanding of the complexities of the situtation by a discussion of some "useless" theorems, such as: Riemann's theorem on the rearrangement of conditionally convergent series; or the fact that given any convergent series (or a countable collection of such series), there exists a convergent series which converges more slowly than the given series (than each of the given series).

P. T. MIELKE, *Secretary*

NOVEMBER MEETING OF THE NORTHEASTERN SECTION

The tenth annual meeting of the Northeastern section of the MAA was held on November 28, 1964, at the Worcester Polytechnic Institute in Worcester, Mass. There were 132 people registered for the meeting including 109 members of the Association. Professor Harold Dorwart, Chairman of the Section, presided at the morning meeting and Professor Grace Bates, Vice-Chairman of the Section, presided at the afternoon meeting. At the business meeting the following were elected as officers of the Section for the year 1964–65: Chairman, Professor Grace Bates of Mt. Holyoke College; Vice-Chairman, Professor Hartley Rogers of Massachusetts Institute of Technology; Secretary and Treasurer, Mr. Richard S. Pieters, Phillips Academy.

The following program was presented: