Magnus R. Hestenes

Born 1906, Bricelyn, Minn.; died May 31, 1991, Los Angeles, Calif.; best known for his work on the "Problem of Bolza"[1] or his 1951 paper on quadratic forms in Hilbert space, and for the development of the conjugate gradient method.

Education: BS, St. Olaf College, 1927; MA, University of Wisconsin, 1928; PhD, University of Chicago, 1932.

Professional Experience: postdoctoral scholar, University of Chicago, 1932-1933; national research fellow, Harvard University, 1933-1937; assistant (and later associate) professor, University of Chicago, 1937-1947[2]; UCLA: professor, 1947-1973, part-time member, INA, 1949-1954, chair, Mathematics Department, 1950-1958, director, Computing Facility, 1961-1963.

In the late 1940s the introduction of "high-speed" computers was raising questions about the usefulness and accuracy of such methods as Gaussian elimination for the solution of linear systems. During this time, the Institute for Numerical Analysis (INA), National Bureau of Standards, organized a seminar to study computational methods, and from this interaction many fruitful ideas arose, including the method of conjugate gradients. Hestenes and Eduard Stiefel (of Zurich) devised the method independently, but merged their ideas into a single paper in 1952. It took almost 20 years for computer technology to catch up with Hestenes' ideas, making possible the storage and solution through conjugate gradients of large sparse linear systems for which elimination methods were impractical.[3]

BIBLIOGRAPHY

Biographical

Berkovitz, Len, Tony Chan, Alfred Hayes, Dianne O'Leary, and Richard Tapia, "Obituary," *SIAM News*, Vol. 24, No. 5, Sept. 199 1.

Hestenes, Magnus, "Conjugacy and Gradients," in Nash, Stephen, *A History of Scientific Computing*, ACM Press, New York, 1990, pp. 167-179.

[1] Also known as the Problem of Lagrange or the Problem of Mayer.

[2] During the latter years of World War It, Hestenes was a member of the Applied Mathematics Group at Columbia University concerned with the mathematics of aerial gunnery.

[3] From Berkovitz et al. 1991.

Significant Publications

Hestenes, Magnus, and E. Stiefel, “Methods of Conjugate Gradients for Solving Linear Systems,” *J Research*, National Bureau of Standards, Vol. 49, 1952, pp. 409-438.

UPDATES

Portrait added. (MRW, 2013)