



## ABDEL-AZIZ A. FOUAD

1928–2017

Elected in 1996

*“For contributions to the analysis of the dynamics,  
stability, and control of electric power.”*

BY VIJAY VITTAL

**A**BDEL-AZIZ AHMED FOUAD, a celebrated academic scholar and industry consultant in electrical engineering, and Emeritus Anson Marston Distinguished Professor at Iowa State University, passed away at the age of 89 on October 21, 2017. In addition to his significant contributions as a lifelong educator, his research changed our understanding of the dynamic behavior of the large power grid, enabling better analysis and control that avoided large-scale blackouts.

Aziz was born in Cairo, Egypt, on May 10, 1928. He obtained his BS degree from Cairo University in 1950, his MS degree from the University of Iowa in 1953, and his PhD degree from Iowa State University in 1956, all in electrical engineering.

He started his career as an instructor in the Electrical Engineering Department at Iowa State (1954–56), returned to Cairo as a lecturer at Ain-Shams University (1956–60), and in 1960 joined the Iowa State faculty as an assistant professor of electrical engineering. By 1966 he was a full professor, and in 1990 he was named the Anson Marston Distinguished Professor. He also served as interim chair of the Department of Electrical and Computer Engineering (1995–96).

In addition, he was a visiting professor at the University of the Philippines (1969–71) and at the University of Rio de Janeiro in the summer of 1972.

His industrial experience included engineering assignments with the Cairo Gas and Electricity Administration, Brazilian Traction, Light and Power Co., Ltd., Jersey Production Research Company, and Atomics International. He also worked as a project manager with the Electric Power Research Institute's Electrical Systems Division.

Dr. Fouad pioneered the development of stability analysis of the electric power transmission grid; his contributions increased the reliability of the electricity supply. Electricity generators across North America spin in synchrony, producing voltages and currents that fluctuate 60 times a second; for example, generators in Iowa are synchronized with generators in Florida and Ontario. A massive blackout can occur if this synchrony is suddenly lost, so it is necessary to operate the power grid sufficiently far from this condition even if some transmission lines suffer faults that remove them from service. The methods Aziz developed are used in control center software across the nation to keep the transmission grid operating.

He coauthored two books that are classic and foundational references describing the dynamics of large-scale electric power transmission grids: *Power System Control and Stability* (John Wiley & Sons, 1977) and *Power System Transient Stability Analysis Using the Transient Energy Function Method* (Pearson, 1991). Every graduate student seriously studying power system dynamics refers to these books.

Aziz received many honors during his lifetime. In addition to his NAE membership, he was a fellow of the Institute of Electrical and Electronics Engineers and winner of its Herman Halperin Electronic Transmission and Distribution Award (1994). At Iowa State he earned the College of Engineering David R. Boylan Eminent Faculty Award for Research, the Wilton Park International Service Award, the Marston Medal, and the Faculty Citation Award from the ISU alumni association.

Having lived in a variety of countries (Egypt, Brazil, the Philippines) and traveled extensively, Aziz had a great interest in economic development around the world. He founded (and chaired, 1972–78) an interdisciplinary graduate program

at Iowa State University on Technology and Social Change in Foreign Cultures, a program that was revolutionary and very popular. And because of his interest and involvement in the issue of technology and social change, he was appointed to serve on the Commission on International Relations of the National Research Council (1975–78).

Aziz was a very social person, and his delightful humor and easy charm made him the life of a party, whether it was a gathering of close friends in his home or a professional event on the other side of the world. He was an avid tennis player and a bridge enthusiast. He was a long-time member of the Rotary Club of Fort Collins and a contributing member of the Northern Colorado Senior Tennis League.

While at the University of Iowa, Aziz met his wife of 56 years, Maria Elisabeth (née Leal) Fouad. She predeceased him in 2009. They are survived by their two children, Nadya Fouad (Robert Leitheiser) and Sam H. Fouad (Jill Norman), five grandchildren, and two great-grandchildren.