

Dr. Harold Mortazavian remarks

We are gathered here this evening to honor the memory of a man of science, a mathematician and a leading engineering pioneer of exceptional creativity and extraordinary energy and inventiveness, A. V. Balakrishnan.

My acquaintance with Balakrishnan goes back thirty three years ago where at UCLA he was a teacher and a mentor to me. Ten years later in 1993, he invited me back to UCLA to join the NASA-UCLA Center for Flight Systems Research where I stayed for several years. Over the many years of close association with Bal, I learned a great deal from him, not only in the way of formal knowledge, but also by way of precious advice, moral support and example. Our relation was one of deep respect and trust.

I had occasion to, however modestly, return some of the debt I owed him when he entrusted upon me the teaching of his course on Kalman Filtering Theory as well as his course on Stochastic Processes, based on his own books. Later, when I had the privilege of serving on some policy-related councils at the national level, I often reflected on the experience gained throughout the long years, as I pondered the questions of the relation between theory and practice and the imperative of formulating sound policy on the basis of rigorous scientific principles.

Balakrishnan's work may be divided into two parts, one mathematical, the other applied. His applied work may be unified around a few central themes. Moreover, there are often in some sense directly or indirectly related to his purely mathematical work.

His most significant mathematical work was his early results on the fractional powers of closed operators and the semi-groups generated by them. These results that were later expanded upon by others have a worthy place in functional analysis. They are now a standard part of the subject as may be evidenced for instance by their inclusion in the classic book on functional analysis by Yosida.

His other significant contributions included works on infinite-dimensional systems, control of systems governed by partial differential equations, control of stochastic systems, the continuum theory of aeroelasticity, and numerous aerospace applications.

That he was able to publish a significant and original work on aeroelasticity in 2012, at the age of eighty-nine, was a testimony to his enormous vigor and the

immensity of his intellectual powers, as well as the rigor, discipline and devotion with which he approached all his work.

His contributions to NASA and the aerospace industry as a whole, involving solution of important theoretical as well as practical problems, were numerous and of great significance.

One notable example was his contributions to the problem of aircraft controller design in the presence of turbulence, involving an identification problem of stochastic processes with nonrational spectra that he approached via the infinite dimensional theory.

Balakrishnan also engaged in a great deal of organizational and administrative work, which he performed with remarkable skill and considerable success. These included establishing international collaborations and promoting scientific exchanges, in particular with scientists from the former Soviet Union, Europe and elsewhere.

His scientific legacy includes several books and nearly two hundred papers. During his very long and enormously fruitful academic career, he had numerous students, many of whom went on to make notable contributions of their own.

He was the recipient of NASA Public Service Medal and the Richard E. Bellman Control Heritage Award, among others.

The USC Viterbi School of Engineering and the University of Southern California must be commended for its worthy decision to establish the Balakrishnan Chair in Engineering.

It is hoped that this worthy decision will endow his legacy with a measure of permanence by fostering the intellectual climate and creation of the institutional setting in which solid foundations may be built for future scientific and technical progress.

Those of us who knew him well will forever treasure the memory of this exceptional man. Let us hope that we may continue to honor his legacy through our own devotion to high standards of scientific excellence and to cultivation of the spirit of disinterested scientific inquiry in future generations.

