Introduction of Professor Zeev Schuss

by

D. Holcman

Akko, May 30 2017,

Dear friends and colleagues,

It is my pleasure to introduce Professor Zeev Schuss for the occasion of his 80th Birthday. I would like to thank the IMU for the hospitality and the organizing committee Yehuda Pinchover, Koby Rubisntein, Amir Yehudayoff for making this event possible.

Zeev was born in Poland 1937, graduated in composition, conducting, and theory from the Academy of Music in Tel Aviv 1963, at the same time he graduated in mathematics 1965 and got his PhD in mathematics from Northwestern 1970. He became professor at TAU and served the chairman of applied mathematics 1993-1995. He published over 200 papers in pure and applied math, chemistry, physics, engineering, and biology. He wrote 8 books on applied math, published by Springer and Wiley. He supervised tens of MSc and PhD students in the above disciplines; quite a few of them hold positions in prestigious institutions across the world (Israel, USA, Europe, and China).

Zeev is an exceptional applied mathematician who prefers to provide context rather than formal proofs, and to explain science in the tradition that goes back probably to Galileo.

We should ask first what applied mathematics is. By definition, it is mathematics developed and applied to the sciences, engineering and more. Its purpose is to analyze, compute, simulate or discover new features and therefore its goal is to discover, not necessarily formal proof, but to find new mechanisms through modeling, new explanations from computations, and more important, to define the new computations needed and to carry them out as accurately as possible.

One of the most robust and efficient tools for finding physical laws are closed formulas, obtained by the method of asymptotic approximation to solutions of PDEs.

These formulas are particularly valuable for resolving singular behavior, where practically infinite computer time is needed to explore a modest fraction of the parameter space. Designing fast and efficient simulations is also a key to success. In this context, finding a proof is not the most urgent mission.

I should mention that the asymptotic approach has been used successfully more than once, by Poincare for studying divergent series or by Ramanujan in summation of series in number theory or by Chandrasekar in many statistical physics problems. Zeev made several times significant contributions in applying asymptotics of rare events, such as thermally activated escape from an attractor in physics, chemistry, and in loss of lock in signal tracking. Another innovation is the formula for the narrow escape time in molecular and cellular biophysics.

Finally, to illustrate the unexpected path of Zeev, paved with obstacles, but also opportunities of the developing sciences, we have chosen the path of the Teheran children, where Zeev participated both as a kid, but also as a defender in a trial that lasted 10 years to establish the historical truth about ultimately what we call in modern history, the price of being a victim.

Zeev decided to give a general talk about his road to applied mathematics at a moment of time, when the renewal of applied math in Israel is suffering from emigration of young applied mathematicians, a fact that may have consequences for academic research and the high-tech economy in Israel.

I would like to welcome now Professor Zeev Schuss.