



UAA College of Engineering
UNIVERSITY of ALASKA ANCHORAGE



UAA Professional Development Seminar Series

Can We Trust Numerical Results?

Presented by Siegfried M. Rump

It may be safe to say that the vast majority of numerical results are sufficiently accurate. However, pitfalls occur rarely enough not to be bothered all the time, yet not rare enough to ignore them. In particular, security-relevant tasks require some extra care. We will start with a number of examples where the best numerical algorithms in Matlab compute erroneous or completely wrong results. That is not to blame Matlab, but it is a principle problem of traditional numerical algorithms. Next, we will present methods producing rigorously verified results—where error bounds are computed which are mathematically correct with the certainty of a mathematical proof. More computing time is required which may amount to an order of magnitude; in return, the results are true with mathematical rigor. Such algorithms are implemented in INTLAB, the Matlab/Octave toolbox for Reliable Computing. Pros and cons of such methods including computing times will be discussed and demonstrated.

Dr. Siegfried Rump has a diploma of Mathematics from the University of Kaiserslautern and received a Ph.D. in Mathematics at the University of Karlsruhe. He has worked for IBM Research and Development at Böblingen, and as the head of the Institute for Reliable Computing at Hamburg University of Technology. Siegfried has been a visiting Professor at University Paris VI Sorbonne, France, and since 2002, has been a visiting Professor at Waseda University, Tokyo, Japan.

Friday, February 1, 2019

11:45 am-12:45 pm

UAA College of Engineering, EIB 211