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Nonlinear Approximations, Multi-linear Tools and Algorithms with Finite but Arbitrary Accuracy.

There are numerous instances of algorithms implemented repeatedly (with some variations) in different applications by different users. On the other hand, algorithms like the FFT or those of dense linear algebra (LAPACK) enjoy multiple users and relatively few professional implementers.

In order to have multiple users of the same software across various applications, we need adaptive algorithms that assure accuracy and map well onto some "standard" data structure. This, in turn, requires a systematic method of approximating and representing operators, in particular, those of mathematical physics.

This talk will discuss several successful examples of finding efficient approximations of operators and outline issues on the road ahead.