NOTES ON PARLETT'S THE SYMMETRIC EIGENVALUE PROBLEM

Note. At last, I have found the right successor to Hefferon's Linear Algebra. What made the search take so long is that I was searching for a pure linear algebra book, while, in this case the right book (thanks to internalizing and cherishing the Lakatosian argument of proof-generated concept) has to have an applied flavor. Luckily, the author has the right style, and the book is 'The Symmetric Eigenvalue Problem' by Parlett. Already the introduction fixes many wrongs and clarifies many long standing doubts (Rn versus En, angles, transposes, etc.)

Note. This is one of the few books where the effort of meta-reading between the lines is not necessary, as the 'meta' information is directly provided by a very willing author who has no need for cover.

Note. The numerical analysis component of the book is very useful, especially when seen from a pure mathematics point of view. In fact, this is the first proper mathematical book I read that is heavy on numerical analysis, properly presented, that is, not from the point of view of a 'programmer'.

Note. I finally realized, while reading among other things about Chebyshev acceleration [p.329-14.3.1], how conditionally executed algorithmic steps, per example restarting some procedure, renormalized some vector, etc., should be properly thought of. One must first have internalized the logical fact that there are lots of ways to compute a certain result, and not identify the goal with the path; an excellent example being the history of methods for the computation of Logarithms in Stillwell. During an algorithm, seen as a sequence of operations converging to some wanted result, one can deviate from a base (pure) procedure, by *jumping* at the right time, thus accelerating convergence. This is done by, at some iteration, detecting a specific opportune pattern based on history or the current state, and *jumping* to state that is better than the basic next state.

Note. Note: triv, the lake and finally a correct appreciation of set theory. E.g lin maps as inhabitants, generalizing conserv of two of the simplest binary forms map(op(a,b)) IDENT op(map(a),map(b)), etc. In this sense eigenvals are also individual inhabitants, etc. Note how Parlett give us confidence in our old problem with the term *linear*, by claiming additive is the right term for linear although it is too late to change.

Note. Find the paragraph in the Lanczos section about the 'misconvergence', this is an excellent weapon in discussions, (in relation to convergence and Cauchy sequences?)