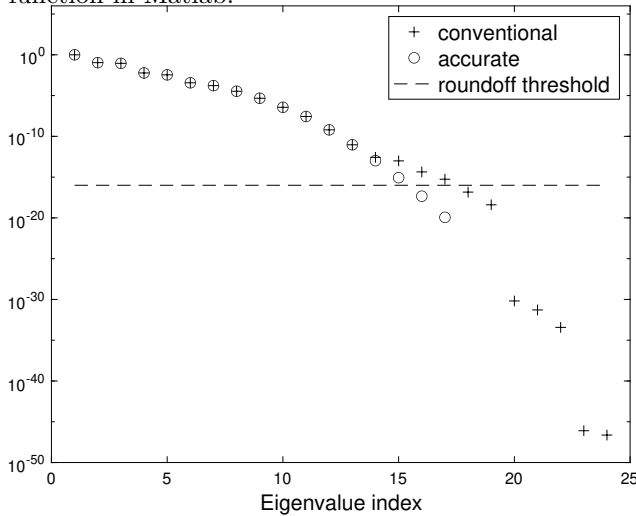


## Appendix - Numerical experiments

Numerous numerical experiments were conducted in order to demonstrate both the usefulness and the correctness of the new formulas. Here is presented the result of a numerical experiment with a  $24 \times 24$  singular q-Bernstein-Vandermonde matrix with nodes:

0.1, 0, 2(times), 0.3, 0.31, 0.32, 0.33, 0.34, 0.35, 0.36, 0.37, 0.38, 0.39, 0.5, 0.6, 0.7(6 times), 0.8, 0.9

As the matrix has 17 distinct nodes, it should have 17 distinct eigenvalues. The graphic shows the accuracy of the program STNEigenvalues from STNTool, using the new formulas, compared to the eig function in Matlab.



The computation of eigenvalues using the new formulas produces results which are correct to at least 14 decimal digits, while the standard algorithm had only managed to compute the largest eigenvalues correctly, and the zero eigenvalues were completely lost to roundoff.

The programs which compute the BDs are available here: <https://github.com/StevenSpasov/STNBD>

The programs used for the computations are available on: <http://www.math.sjsu.edu/~koev/>