## Node orderings in the Newton interpolation formula

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The Newton formula of the Lagrange interpolant is a common representation of the solution of the Lagrange interpolation problem. The stability properties of this formula depend on the ordering of the nodes. We study these properties using the conditioning associated to the representation defined in [1]. Although the increasing (or decreasing) ordering of the nodes seems natural, the rounding error grows quickly in a neighborhood of the last node. A successful alternative giving rise to good stability properties is provided by the Leja ordering (see Section 22.3.3 of [2]). Alternative orderings, leading to a simplified analysis, can be used instead of the Leja ordering. We present the central ordering with respect to a center for any set of nodes. In the particular case of equidistant nodes, we provide an upper bound of the conditioning. Numerical examples comparing this ordering with increasing and Leja orderings are included.

Joint work with: J. M. Carnicer, J. M. Peña.

## References

- J. M. Carnicer, Y. Khiar, J. M. Peña. Optimal stability of the Lagrange formula and conditioning of the Newton formula. To appear in *J. Approx. Theory*, DOI: 10.1016/j.jat.2017.07.005.
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