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Towards a more robust algorithm for computing the Kerr quasinormal mode frequencies

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Leaver's method has been the standard for computing the quasinormal mode (QNM) frequencies for a Kerr black hole (BH) for a few decades. We start with a spectral variant of Leaver's method introduced by Cook and Zalutskiy (arXiv: 1410.7698) and propose improvements in the form of computing the necessary derivatives analytically, rather than by numerical finite differencing. We also incorporate this derivative information into qnm, a Python package which finds the QNM frequencies via the spectral variant of Leaver's method. We confine ourselves to first derivatives only.

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