

CHAPTER OVERVIEW

1: Numerical Methods

This chapter is not intended as a comprehensive course in numerical methods. Rather it deals, and only in a rather basic way, with the very common problems of numerical integration and the solution of simple (and not so simple!) Equations. Specialist astronomers today can generate most of the planetary tables for themselves; but those who are not so specialized still have a need to look up data in tables such as The Astronomical Almanac, and I have therefore added a brief section on interpolation, which I hope may be useful. While any of these topics could be greatly expanded, this section should be useful for many everyday computational purposes.

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Thumbnail: Comparison between 2-point Gaussian and trapezoidal quadrature. The blue line is the polynomial, whose integral in $[-1, 1]$ is $2/3$. The trapezoidal rule returns the integral of the orange dashed line. The 2-point Gaussian quadrature rule returns the integral of the black dashed curve. Such a result is exact, since the green region has the same area as the red regions. (CC BY-Sa 4.0; [Paolostar](#)).

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