

A vibrant, abstract image of the cosmic web, showing a complex network of glowing orange and red filaments and clusters of stars against a dark blue background. A large, semi-transparent white circle is overlaid on the left side of the image, containing the course information.

Phys 305

Prof. Elisabeth Krause (she/her)

TAs: Marco Jimenez (he/him)
Maria Mutz (she/her)

Today's Lecture

- Announcements
 - **Problem Set 3** due 9/21/2020 at 5:00 pm (on D2L)
 - Note: no more point deductions for submitting a notebook instead of compressed folder with code for each problem!
- Today's lecture: Gaussian Quadrature
- Outlook: ODEs

Gaussian Quadrature

So far, we focused on uniformly spaced grid points (nodes). **Gaussian Quadrature** is an algorithm that chooses the nodes such that in the approximation

$$\int_a^b f(x)dx = \sum_{i=1}^n c_i f(x_i)$$

the error is minimized in the sense that the result is **exact** for the class of polynomials of degree $(2n-1)$.

This is because Gaussian Quadrature treats both c_i and x_i as parameters, i.e., there are $2n$ parameters which is the number of parameters in a polynomial of degree $(2n-1)$.

Let's find out how in `GaussianQuadrature.ipynb`