L21: class exercises – Try to implement/solve the following problems in MATLAB.

Linear interpolation

Load the two data sets *series1.txt* and *series2.txt* using the **load()** function. Both synthetic data sets contain a two-column matrix with 339 rows. These data come from the book *MATLAB Recipes for Earth Sciences*.

The first column contains ages in kiloyears, which are unevenly spaced. The second column contains oxygen-isotope values measured on calcareous micro-fossils (foraminifera). The data sets contain 100, 40 and 20 kyr cyclicities and they are overlain by Gaussian noise. In the 100 kyr frequency band, the second data series (series 2) is shifted by 5 kyrs with respect to the first data series (series 1).

1. Make a new time vector from 0 to 996 kyr, with a sample interval of 3 kyr.
2. Use **interp1()** to linearly interpolate both series1 and series2. *(You may need to look at the MATLAB help/doc for interp1.)*
3. In one figure, use subplot 1 to plot the raw data and interpolated data. Window the x-axis from 350 to 450 kyr. *(It may help to the plot the raw data as points and the interpolated data as a line.)*
4. In the same figure on subplot 2, plot the same thing but for series 2.

If time, try redoing this exercise, using one of the other interpolation methods instead of 'linear' interpolation. Do you notice any differences?

- Piecewise Linear Interpolation (linear)
- Piecewise Cubic Hermite Interpolation (cubic)
- Shape-Preserving Piecewise Cubic Interpolation (pchip)
- Piecewise Cubic Spline Interpolation (spline)