

Theory assignment 1

- Derive Eq. 3.1.5 (the equations for $C_{m+1,i}$ and $D_{m+1,i}$ and bring to viva for week 2.
- Print out the tableau for Q1 of the lab assignment, and determine the best “route” through the tableau to get the interpolated data.
- Is there a sampling theorem? Take $\sin kx$ for different k and sample it with fewer and fewer points between 0 and 10. Study the error vs order. Is there a maximum spacing? What does it depend on? *Justify your conclusion theoretically. Note the following theorem (page 49 of Stoer):*

$$f(x) - p(x) = \frac{\omega(x)f^{(n+1)}(\xi)}{(n+1)!}$$

where $x_i \leq \xi, x \leq x_{i+1}$ for some i and

$$\omega(x) = (x - x_0)(x - x_1) \dots (x - x_n)$$

- For bonus marks, derive Eq. 3.2.3 (the equation for $R_{i(i+1)\dots(i+m)}$).