Notes

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1 Notes

1.1 Task 1

We want to solve $u_{xx} = f(x)$ such that $u_x(1) = \sigma$ and $u_x(1) = \sigma$. To validate the algorithm will we assume that

$$f(x) = \cos(2\pi x),$$

which can be easily be solved analytically by integrating u.

$$u(x) = -\frac{\cos(2\pi x)}{4\pi^2} + \frac{x^3}{6} + \left(\sigma - \frac{1}{2}\right)x + \alpha, \quad u(0) = \alpha$$

$$u_x(x) = \frac{\sin(2\pi x)}{2\pi} + \frac{x^2}{2} + \left(\sigma - \frac{1}{2}\right), \quad u_x(1) = \sigma$$

$$u_{xx}(x) = \cos(2\pi x) + x$$

2 References