# Computational Earthquake Engineering
# Report #1 (1D finite-element method)

2019/12/9

Consider a problem

$$\frac{d^2u}{dx^2} = 1, \quad (0 \leq x \leq 1),$$

with boundary conditions

$$u = 0, \quad (x = 0),$$

and

$$u = 0, \quad (x = 1).$$

1. Derive analytical solution of $u(x)$.
2. Solve $u(x)$ using one-dimensional linear elements with Gaussian elimination solver, and compare numerical solution with analytical solution. Here, use mesh indicated in Fig. 1.
3. Solve $u(x)$ using one-dimensional linear elements with Gaussian elimination solver, and compare numerical solution with analytical solution. Here, use mesh indicated in Fig. 2.

Note: Implement program using Fortran or C.
Due date: 2019/12/23 (submit report and source file to ITC-LMS).
Important: We will grade this course if you submit at least one of the reports.
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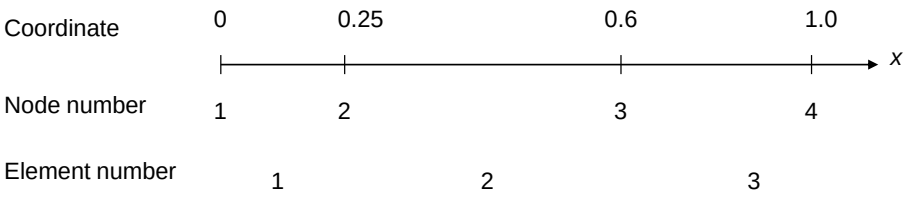


Figure 1

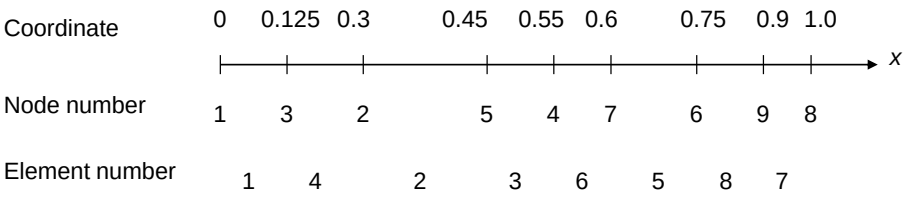


Figure 2