Engineering Design via FEM

Fall 2017, TUE/THU 10:30-11:45, Building E11- Room 101

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Prerequisites:	Undergraduate Solid Mechanics and Mathematics
Reference books:	*A first course in finite elements*, J. Fish, T. Belytschko, 2007
	Finite element procedures, K.J. Bathe, 1996, *2nd edition*, 2014
Grades:	Homeworks (30%) + Term Project (30%) + Final Exam. (40%)

This course introduces FEM (finite element method), and its application for mechanical engineering design and analysis at the undergraduate level. Basic principles of FEM are discussed with the aid of various mechanics examples, with the minimum usage of advanced math skills. Typical examples include the coverage of simple elements such as spring, truss and beam elements via the principle of virtual work, and the extension of this concept to the continuum mechanics problems. Students will be exposed to the intensive use of commercial FEM software during the practice hours to acquire various modeling and analysis techniques for practical applications.

Schedule

Week	Contents	Week	Contents
1	Introduction to FEM Review of solid mechanics	9	Isoparametric finite elements (2D solid elements) ANSYS session - 4
2	Matrix structural analysis (bar & truss system)	10	Isoparametric finite elements (2D solid elements) ANSYS session - 5
3	Principle of virtual work (bar problems)	11	FE solutions and convergence Plate, shell and 3D solid elements
4	Procedure of finite element analysis Introduction to ANSYS	12	ANSYS session - 6 ANSYS session - 7
5	ANSYS session - 1 ANSYS session - 2	13	Temperature field analysis ANSYS session - 8
6	Holiday (Korean thanksgiving day)	14	ANSYS session - 9
7	Principle of virtual work (2D solid problems) ANSYS session - 3	15	Term project presentation
8	Midterm examination period (Term project proposal)	16	Final examination