

Project 1. (Due October 24, 2008)

Math 353 Section 12, Fall 2008, University of Delaware

1. Kinematics of the Stewart platform (two-dimensional version).

Reality Check 1. (Text book page 71)

Direction: Do all questions 1 through 7. Skip question #8. You have to use at least three different methods in question #4. Determine which method have better performance and explain it.

Additional References:

- Stewart, D., (1965-66) A Platform with Six Degrees of Freedom, The Institution of Mechanical Engineers, Proceedings 1965-66, 180 Part 1, No. 15, pp. 371-386.
- www.mathworks.com (search: stewart platform)
- J.P. Merlet, *Parallel Robots*. Kluwer Academic Publishers, London (2000)

2. The Euler-Bernoulli beam.

Reality check 2. (Text book page 123)

Do all questions 1 through 6. Skip question #7. In questions #2 and #5, derive a closed form solution.

Additional References:

- "The Da Vinci-Euler-Bernoulli Beam Theory?." Mechanical Engineering Magazine Online. Published on April 18 2003. Accessed on June 17 2005.
- E.A. Witmer. (1991-1992). "Elementary Bernoulli-Euler Beam Theory". MIT Unified Engineering Course Notes, pp. 5-114 to 5-164.
- Graham M.L. Gladwell. *Inverse Problems in Vibration*. Kluwer Academic Publishers. (2004) (Chapter 13)

Your report should have the following sections:

1. Introduction. (for each problem)
2. Detailed answers for the questions. You might put MatLab codes in appendices.
3. Conclusion.
4. References.
5. Appendices.