CVE154 Exam 2, Part 3

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Referring to Figure 1, the rigid tripod assembly is subject to a force $\boldsymbol{F} = 2.4\mathbf{i} + 7.1\mathbf{j} - 9.6\mathbf{k}$ lb, supported by a ball-and-socket joint at B and by rollers at A and C.

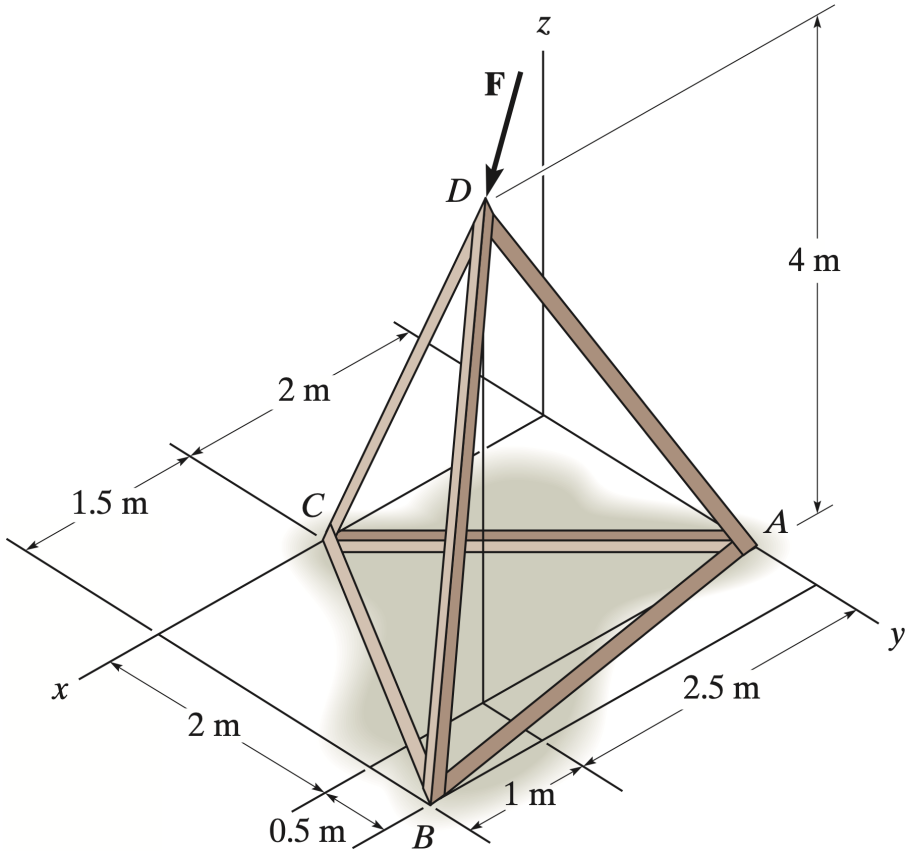

Figure 1 The tripod assembly is supported by a ball-and-socket joint and rollers. The image is a screenshot of the accompanying figure for Problem 4-61 of *Engineering Mechanics: Statics and Dynamics (14th ed.)*, the authorship and copyright of which belong to R. C. Hibbeler.

P1 (15 pt.) Derive a system of linear equations $\boldsymbol{Ax} = \boldsymbol{b}$ where $\boldsymbol{x}$ collects the unknown z-components of the reaction forces. Comment on the solvability of the linear system by making observations on $\boldsymbol{A}$.

P2 (10 pt.) Solve for $\boldsymbol{x}$ via Gaussian elimination. You may use any pivoting strategy.

P3 (15 pt.) Solve for $\boldsymbol{x}$ via LU decomposition. You may use any pivoting strategy.