CE C30/ME C85, Section 2, Midterm Examination

Open books and notes, online, 1 hour

Maximum of 3 one-sided pages per problem

March 17, 2021

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BOX YOUR ANSWERS

NUMBER PAGES
PER PROBLEM
Page 1.1, Page 1.2, . . .
Page 2.1, . . .
. . .

Problem 1:	**/40**
Problem 2:	**/25**
Problem 3:	**/35**
TOTAL:	**/100**

CE C30/ME C85, Section 2, Spring Semester 2021

Online Examinations Honor Code Statement

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By signing below, I acknowledge that, following the earlier established and agreed rules for online examinations in this course:
  (1) I have worked out this examination individually,
  (2) I have not discussed nor communicated about any part of the exam with anybody, in any way, during the exam,
  (3) I have complied with the time assigned to the exam and its submission, acknowledging that no late submissions are accepted, and
  (4) The pages included in the PDF file that I am submitting form the totality of my exam, complying with the limitation of three one-sided pages maximum per problem.

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Problem #1 (40%)

A rigid bar is held horizontally by two elastic cables as shown in the figure. The cables have the same Young modulus E and cross section area A. All connections are pinned, and all members can be considered weightless.

A vertical load P is applied at the right tip of the bar, as shown. Determine:

1. The forces in the cables.

2. The displacement of the right tip of the bar.
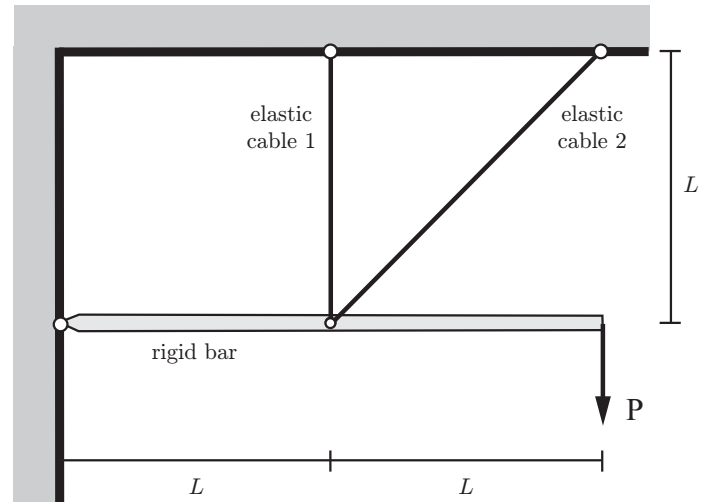
Problem #2 (25%)

1. Determine the forces in all the members in the truss of the figure when the vertical load of value P shown in the figure is applied. Indicate clearly if the member is in tension or compression, and identify all zero-force members, if any.

2. If all the members have the same $0.1 \times 0.1 \ m^2$ square cross section, determine the maximum load value P that can be applied with a factor of safety of 1.5 if the material can only take $10 MPa$ in tension or compression.
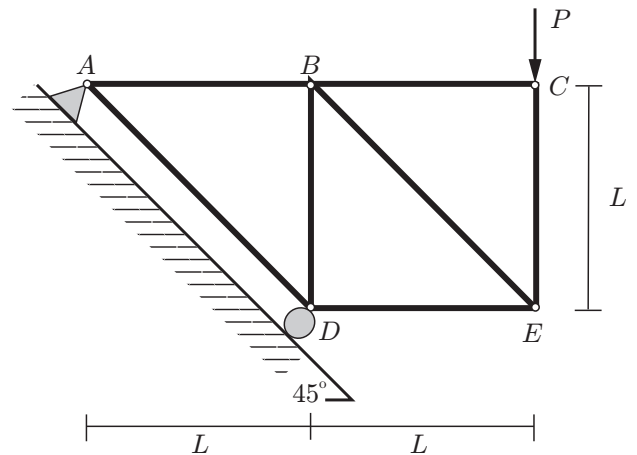
Problem #3 (35%)

Draw the axial force, transversal shear force and bending moment diagrams for the beam shown in the figure. Indicate the characteristic values (min/max values, values at the ends and supports, slopes, linear/parabolic/cubic distributions,...).