**LECTURE ASSIGNMENT 2**

Find the displacement  of a bar of length *L* using the boundary value problem

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given by the continuum model. Assume that the cross-sectional area *A*, Young’s modulus *E* of the material, density  of the material, and acceleration by gravity *g* are constants.

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First, repeated integrations with the differential equation are used to find the generic solution. Let the integration constants be  and :

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Second, boundary conditions are used to find the values of the integration constants  and :

 and  

 and .

Finally, the values of the integration constants are substituted into the generic solution to get the solution:

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