Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Student number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Assignment 2**

Consider the plate strip loaded by its own weight as shown in the figure. Thickness*,* width, and length of the plate are , *b*, and , respectively. Density , Young’s modulus , and Poisson’s ratio are constants. Find the unknown parameter  of the assumed transverse displacement . The origin of the material coordinate system is placed at the symmetry plane of the plate.

*L*

*x*

*z*

*g*

**Solution template**

Virtual work density expressions of the plate bending mode are

 and .

in which  is the component of the distributed force per unit area,  is the thickness of the plate, and the elasticity matrix of plane stress is given by

.

Under the displacement assumption , virtual work densities of the plate model simplify to

,

.

Integration over the area of the plate symmetry plane gives the virtual work expressions

,

.

Principle of virtual work with  and the fundamental lemma of variation calculus imply the solution

  

 

.