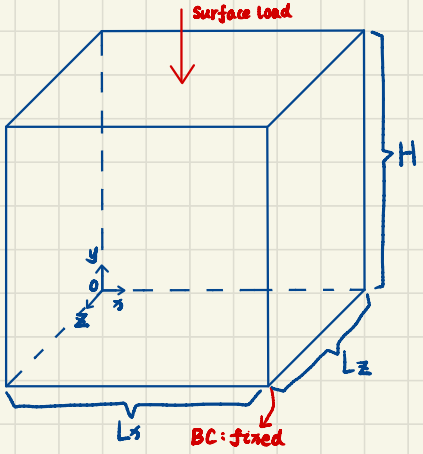
HW 1 Yu Niu 8/31/2025



Q1:

Assumption:

- The bearing has dimensions of L_x, H, and L_z in the x, y and z directions.
- The top surface is subject to compression, while the bottom surface is fixed.

Displacement field function:

$$w(x,y,z) = A\sin\left(\frac{\pi y}{H}\right)\left(\frac{2z}{L_z} - 1\right)$$

- A is the bulging amplitude coefficient, determined by experiments or assumptions.

when $z=0$, $w(x,y,z) = -A\sin\left(\frac{\pi y}{H}\right)$ (the bulging effect is the largest)

when $z=L_z$, $w(x,y,z) = A\sin\left(\frac{\pi y}{H}\right)$ (the bulging effect is the largest)

when $z=\frac{L_z}{2}$, $w(x,y,z) = 0$ (the bulging effect is 0)

when $y=0$, $w(x,y,z) = 0$ (the bulging effect is 0)

when $y=H$, $w(x,y,z) = 0$ (the bulging effect is 0)

when $y=\frac{H}{2}$, $w(x,y,z) = A\left(\frac{2z}{L_z} - 1\right)$ (the bulging effect is the largest)