$$\left(\beta\int_0^1\left(\frac{\partial\bar{w}}{\partial\bar{x}}\right)^2 d\bar{x}\right)\frac{\partial^2\bar{w}}{\partial\bar{x}^2}-(1+\gamma)\frac{\partial^4\bar{w}}{\partial\bar{x}^4}+\alpha\frac{\partial^2}{\partial\bar{x}^2}\left[\left(\phi\left(\bar{x},\frac{1}{2}\right)-\phi\left(\bar{x},-\frac{1}{2}\right)\right)\right]+\bar{q}=0 \quad (39)$$

$$\frac{\partial^2\phi}{\partial\bar{x}^2}+\left(\frac{L}{h}\right)^2\frac{\partial^2\phi}{\partial\bar{z}^2}=0 \quad (40)$$

$$\bar{w}\big|_{\bar{x}=0,1}=0 \quad (41)$$

$$\left[-(1+\gamma)\frac{\partial^2\bar{w}}{\partial\bar{x}^2}+\alpha\left(\phi\big|_{-1/2}^{1/2}\right)\right]_{\bar{x}=0,1}=0 \quad (42)$$

$$\left[\left(\frac{L}{h}\right)\frac{\partial\phi}{\partial\bar{z}}+\eta\frac{\partial^2\bar{w}}{\partial\bar{x}^2}\right]_{\bar{z}=-1/2,1/2}=0 \quad (43)$$

$$\phi\big|_{\bar{x}=0,1}=0 \quad (44)$$

In the above equations, the constants are expressed as:

$$\beta=\frac{Mh^2L}{(\lambda+2\mu)I},\quad \alpha=\frac{2bfL^2}{(\lambda+2\mu)Ih},\quad \gamma=\frac{4\mu Al^2}{(\lambda+2\mu)I},\quad \bar{q}=\frac{q_0L^4}{(\lambda+2\mu)I},\quad \eta=\frac{fh}{\varepsilon_0 L} \quad (45)$$

$$M=\frac{(\lambda+2\mu)A}{2L},\qquad K=(\lambda+2\mu)I+4\mu Al^2$$

Where

```
> E := 107.8077e9;
                    E := 1.07807710^11
> nu := 0.2565;
                    ν := 0.2565
> epsilon := 8.85e-12;
                    ε := 8.85 10^-12
> q0 := 0.02;

                    q := 0.02
>
> f := 5e-12;
                    f := 5. 10^-12
> landa := E·nu / ((1 + nu)·(1 − 2·nu));
                    landa := 4.51903490810^10
> miu := E / (2·(1 + nu));
                    miu := 4.29000000010^10
> b := 10e−9;
                    b := 1.0 10^-8
> h := 15e−9;
```

$$h := 1.5\ 10^{-8}$$

> $l := 0.2 \cdot h;$

$$l := 3.0\ 10^{-9}$$

>

> $I := \frac{b \cdot h^3}{12};$

$$II := 2.81250000010^{-33}$$

> $A := b \cdot h;$

$$A := 1.50\ 10^{-16}$$

> $L := 300\text{e}-9;$