# FEA Verification — Material Properties & Boundary Conditions

| Material Properties | | |
|---|---|---|
| **Property** | **Symbol** | **Value** |
| Material | | Doped poly-Si (LPCVD) |
| Young's modulus | E | 160 GPa |
| Poisson's ratio | ν | 0.22 |
| Density | ρ | 2330 kg/m³ |
| Structural thickness | t | 0.5 µm |
| Lamé parameter | λ | 51,522 MPa |
| Lamé parameter | µ | 65,574 MPa |

| Boundary Conditions & Constraints | | |
|---|---|---|
| | **Notebook 3a (half-beam)** | **Notebook 4a (full spring)** |
| Anchor (left) | x = 0 : clamped, $u_x = u_y = 0$ | x = 0 : clamped, $u_x = u_y = 0$ |
| Anchor (right) | — | x = 80 µm : clamped, $u_x = u_y = 0$ |
| Shuttle | x = L : $u_y$ prescribed, $u_x$ free | Center : $u_y$ prescribed, $u_x$ free |
| Formulation | Geom. nonlinear (NLGEOM) | Total Lagrangian, St. Venant–Kirchhoff |
| Element type | CPE3 (plane-strain triangle) | P1 (plane-strain triangle) |
| Analysis type | 2D plane strain | 2D plane strain |

*Both analyses assume plane strain conditions with thickness t = 0.5 µm and geometrically nonlinear (large deformation) kinematics.*