Modelling hypothesis: $\{\varepsilon\} = \{\varepsilon^M\} + \{\varepsilon^m\}$

- an average macro strain ε^M (periodic), given (and here constant)
- corrector ε^m (**periodic**), which is unknown

Approximation of the displacement field: u^m (associated with ε^m) :

$$\{u^m\} = [N]\{q\},$$

with $[N]$ encapsulating shape functions, q the main unknown.
Small strain hypothesis, the strain ε^m can be determined with

$$\{\varepsilon^m\} = [B]\,\{q\},$$

with $[B]$ be the displacement differentiation matrix.
Let us define the imposed deformation $\{h\}$ and the stiffness matrix $[k]$ as

$$[k] = \int_V [B]^T [E]\,[B]\,dv,$$

$$\{h\} = -\int_V [B]^T [E]\,\{\varepsilon^M\}\,dv,$$

with $[E]$ the **elasticity** matrix. We will solve the following linear system:

$$[k]\,\{q\} = \{h\}\,.$$