The constitutive relation of a heterogeneous anisotropic and elastic solid is expressed by the generalized Hooke's law, which can be written as

$$\sigma_{ij} = c_{ijkl}\varepsilon_{kl}, \qquad i, j, k, l = 1, \ldots, 3,$$

where t is the time, $\mathbf{x}$ is the position vector, $\sigma_{ij}(\mathbf{x}, t)$ and $\varepsilon_{ij}(\mathbf{x}, t)$ are the Cartesian components of the stress and strain tensors respectively, and $c_{ijkl}(\mathbf{x})$ are the components of a fourth-order tensor called the elasticities of the medium. The Einstein convention for repeated indices is used.

To express the stress–strain relation for a transversely isotropic medium we introduce a shortened matrix notation commonly used in the literature. With this convention, pairs of subscripts concerning the elasticities are replaced by a single number according to the following correspondence:

$$(11) \to 1, \quad (22) \to 2, \quad (33) \to 3, \quad (23) = (32) \to 4,$$
$$(31) = (13) \to 5, \quad (12) = (21) \to 6.$$