Material Model and Material Parameters

<table>
<thead>
<tr>
<th>Subdomain</th>
<th>E [MPa]</th>
<th>ν</th>
<th>c_p/H_0</th>
<th>c_d/H_0</th>
</tr>
</thead>
<tbody>
<tr>
<td>epidermis</td>
<td>0.136</td>
<td>0.30</td>
<td>0.0944</td>
<td>0.0454</td>
</tr>
<tr>
<td>dermis</td>
<td>0.062</td>
<td>0.40</td>
<td>0.0944</td>
<td>0.0000</td>
</tr>
<tr>
<td>hypodermis</td>
<td>0.030</td>
<td>0.40</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Yeoh Hyperelastic Material Model is a phenomeno-
logical constitutive model for modelling nonlinear elastic
materials, i.e. compressible rubbers.

Strain Energy Density Function: \( W = \sum c_i (J_i - 1)^{1/2} + d_i (J_i - 1)^3 \)
- bar formulation of the first invariant: \( I_1 = F_{11} F_{22} F_{33} \)
- right Cauchy-Green tensor: \( C = F^T F \)
- enhanced deformation gradient: \( F = I - D \)
- Jacobian determinant: \( J = \text{det}(F) \)

Material constants
- \( c_0 \) - half of initial shear modulus,
- \( d_1 \) - two over bulk modulus,
- remaining constants determined by fitting the model to experimental data

Mesh Generation

Mesh Characteristics
- 4 material domains: epidermis, dermis, hypodermis and nail
- bone not modelled for it is assumed rigid and fixed
- employment of structured mesh with hexahedral topology
- 37,679 nodes and 27,950 elements
- epidermis: 6,906 nodes and 3,090 elements
- dermis: 11,528 nodes and 8,400 elements
- hypodermis: 19,250 nodes and 16,200 elements
- nail: 594 nodes and 260 elements

Correction Coefficient

Since the finger prints are not modelled, adequate correction needs to be
applied to modelled data when fitting the vertical force against experimental-
ta...