5. Homework in Nonlinear Mechanics, 23. 11. 2013

Deadline, 6. 12. 2013

`VSi` is i–th digit of **your** registration number. For registration number 26102734 are `VS6`=7, `VS8`=4.

TASK 1: Consider the following deformations of the body:

$$x_1 = x_1^0 + a x_2^{0\,2}, \qquad x_2 = x_2^0, \qquad x_3 = x_3^0$$

Assume $a = (\texttt{VS7} + 1)\frac{10^{-2}}{\mathrm{m}}$.

a) Sketch the deformed state of the square $[-1\,\mathrm{m}, 1\,\mathrm{m}] \times [-1\,\mathrm{m}, 1\,\mathrm{m}]$.

b) At the point $T(x_1^0 = 1\,\mathrm{m}, x_2^0 = 1\,\mathrm{m}, x_3^0 = 0\,\mathrm{m})$ determine:
   - the deformation gradient F,
   - the left Cauchy tensor $C = F^T F$,
   - the right Cauchy tensor $B = F F^T$,
   - Green Lagrange tensor of deformations E,
   - Euler Almansi tensor of deformations e,
   - tensor of small deformations ε.

c) At the point T determine:
   - decomposition of deformation gradient F,
   - spectral decomposition of the left Cauchy tensor C,
   - spectral decomposition of the right Cauchy tensor B,
   - spectral decomposition of Green Lagrange tensor of deformations E,
   - spectral decomposition of Euler Almansi tensor of deformations e,
   - relationship between eigevectors of Green Lagrange and Euler Almansi tensors of deformations,
   - spectral decomposition of tensor of small deformations ε.