

# Non-periodic homogenization and dimensional reduction in non-linear elasticity in small strain regimes on the example of bending rod

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We will discuss the derivation of the rod model in the bending regime by simultaneous homogenization and dimensional reduction without periodicity assumption. We show kind of stability result for the equations, i.e., in the limit we always obtain quadratic energy density in the standard strain for this regime. This kind of stability is not valid for the plate equations in the bending regime, while it is valid for the plate equations in more linear regime (von Karman). The approach requires slight variation of standard  $\Gamma$ -convergence techniques as well as the standard dimension reduction techniques based on the theorem on geometric rigidity. We will also mention how to adapt the approach to obtain the same result on the level of the equations. The work is collaboration with Maroje Marohnić.