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PARAMETER SENSITIVITY OF A SINGLE LAYER TENSEGRITY MODELLED TISSUE

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Abstract. The state of stress in the tissue that we call mechanical environment is important for the cell behavior (C. Ainsworth, *Nature*, 456:696-699 (2008)). In particular, the stresses may trigger the chemical pathways. Therefore, it is important to model. The cell consists of cortex, collagen, nucleus and cytoskeleton. The particularly important part of the cell is the cytoskeleton that carries most of the loading. We believe that a good method to understand the importance of particular parts of the cellular structure is the parameter sensitivity analysis (M. Kleiber, T.D. Hien, E. Postek. Incremental finite element sensitivity analysis for non-linear mechanics applications. *Int J Num Meth Eng*. 37(19):3291-3308, (1994)). In particular, it is interesting in the case of hierarchical structures. An example of such a structure is the tissue. The single cell is modelled as icosahedral based tensegrity structure. The constitutive model is viscous-elastic. The formulation of the parameter sensitivity problem is done in the Upadated Lagrangian frame. We observe the sensitivity fields due to change of sizing parameters of the microtubules in a single cell and groups of cells. We are able to show which mode of the growth of the cells is the most important for the state of the tissue. However, it has to be still supported by heuristic reasoning.