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EINLADUNG

zum Vortrag von Herrn

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über

A multiphase model for three-dimensional tumor growth

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A multiphase model for three-dimensional tumor growth

Bernhard A. Schrefler

with

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Multiphase porous media mechanics is applied to model tumor growth. The governing equations obtained via the Thermodynamically Constrained Averaging Theory (TCAT) are solved numerically by means of the Finite Element Method. The multiphase system consists of four phases: the extracellular matrix (ECM), the tumor cells (TC), which may include a necrotic portion depending on the environmental conditions and pressure; the healthy cells (HC); and the interstitial fluid (IF) with the dissolved chemical species.

The computational model is applied to solve three cases of biological relevance. In the first case, the growth of a Multicellular Tumor Spheroid (MTS) *in vitro* is modeled providing a good agreement between the numerical and the experimental results. In the second case, the MTS is confined within the healthy tissue which induces less favorable nutrient diffusion reducing substantially the tumor growth rate. In the third case, tumors cells growing along microvessels (the so called “tumor cord”) are modeled in a 3D geometry and it is shown that the malignant cells migrate within adjacent vessels in search of new sources for nutrients and oxygen.