Numerical approximation of a chemotaxis system with logistic growth on networks

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In this talk we consider a chemotaxis system with a logistic growth term on a network structure. It is shown that there exists a unique weak solution which is bounded polynomially in time and, as a consequence, exists globally. Moreover, a finite element method which is modified by mass lumping and upwinding techniques to ensure conservation of mass and positivity on the discrete level is developed. Convergence of the method is proved under general assumptions on the data and optimal convergence rates are obtained if the solution is sufficiently regular. The theoretical findings are illustrated by some numerical examples. This work generalizes the results obtained in the paper ”Chemotaxis on networks: Analysis and numerical approximation” by H. Egger and the author by considering additionally a logistic growth term.

References:

[1] https://arxiv.org/abs/1805.00925

[1]TU Darmstadt, AG Numerik und Wissenschaftliches Rechnen
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