Institut für Mathematik
und Wissenschaftliches Rechnen
Karl-Franzens-Universität Graz

EINLADUNG

zum Vortrag von

Doris H. Fürtinger, PhD
Renal Research Institute, New York

Titel: Approximation of Structured Population Equations Modeling Erythropoiesis and Various Applications

Zeit: Mittwoch, 02. April 2014, 10:30 Uhr

Ort: SR 11.34
Institut für Mathematik und Wissenschaftliches Rechnen
Heinrichstraße 36, 8010 Graz

Abstract:
Chronic kidney failure is a widespread disease and on the increase. The management of renal anemia - a common side effect of this disease - poses major challenges on the treatment, because of its complexity and severity. A comprehensive model for erythropoiesis - the process by which red blood cells are produced - was developed. The core of the model consists of several coupled structured population equations for the different cell populations considered. The numerical approximation for the hyperbolic PDEs is based on semigroup theory, respectively on the theory of abstract Cauchy problems. The system state is approximated by system states of high order differential equations on finite dimensional subspaces of the state space of the original system. The construction of the finite dimensional subspaces involves Legendre polynomials. The model is adapted to individuals by using a standard least-squares cost-functional to asses certain parameters. A low approximation dimension suffices to obtain accurate numerical solutions and estimates for the parameters. The gathered information is used to test different anemia treatment strategies for applicability.

Prof. Klemens **Fellner**