Workshop on Nonlinear Analysis and Optimization

August 20, 2018

Room 814, Amado Mathematics Building

Titles and Abstracts

Christian Bargetz (University of Innsbruck)

Title: Generic convergence of the method of successive approximations for certain set-valued mappings on Banach spaces

Abstract: Given a bounded, closed, and convex subset *D* of a Banach space and a pair of nonex-pansive self-mappings of *D*, we consider the pair of mappings as a set-valued mapping and investigate the generic convergence properties of the method of successive approximation. More precisely, given an initial point $x_0 \in D$, we compute the next iterate by projecting the current element x_n onto its image. We show that for each initial point, for the typical set-valued mapping F of the above form, these projections are unique and that the resulting sequence converges to a fixed point of *F*.
This is ongoing joint work with Simeon Reich (Technion—Israel Institute of Technology).

Emir Medjic (University of Innsbruck)

Title: On the convergence of the alternating method in uniformly smooth and uniformly convex Banach spaces

Abstract: Let X be a uniformly convex and uniformly smooth Banach space and *M , N* be closed linear subspaces, such that their sum *M + N* is closed. We give a new proof for the convergence of the alternating approximation method

$$\lim_{n\to\infty}[(I-P_M)(I-P_N)]^n x = x - P_{M+N}x.$$

Moreover, we present a convergence rate for the above method in Banach spaces which are convex and smooth of power type 2. Furthermore, due to the intimate connection between metric and Bergman projections, we present results on the convergence rate of iterated Bregman projections in such spaces.
This is joint work with Christian Bargetz and still in progress.

Itai Shafrir (Technion)

Title: The best constant in the embedding of $W^{N,1}(\mathbb{R}^N)$ in L^∞ and related topics.

Abstract: We compute the best constant in the embedding of $W^{N,1}(\mathbb{R}^N)$ in L^∞, extending a result of Humbert and Nazaret in dimensions one and two to any N. The main tool is the identification of $\log|x|$ as a fundamental solution of a certain elliptic operator of order $2N$. A variant of the method allows us to obtain a natural variant of D. Adams' higher order sharp estimate for functions in $W_0^{m,N/m}(\Omega)$.
The latter result is joint with D. Spector.

<u>Rafal Zalas</u> (Technion)

Title: Regularity of Landweber operators

Abstract: In this talk we consider a split convex feasibility problem in a fixed point setting. Based on the well-known CQ-method of Byrne (2002), we define an abstract Landweber transformation, which applies to more general operators than the metric projection. We call the result of this transformation a Landweber operator. It turns out that the Landweber transformation preserves many interesting properties. For example, the Landweber transformation of a (quasi/firmly) nonexpansive mapping is again (quasi/firmly) nonexpansive. Moreover, the Landweber transformation of a (weakly/linearly) regular mapping is again (weakly/linearly) regular. These regularity properties are relevant because they lead to (weak/linear) convergence of many CQ-type methods.

This is a joint work with Andrzej Cegielski (Zielona Gora, Poland) and Simeon Reich (Technion) that is still in progress.