Analysis Seminar Thursday November 13, 2014

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Title: *A characterization of non-linear operators satisfying orthogonality properties*

Abstract: Operators on Dedekind complete Banach lattices and more generally on a variety of function spaces are analyzed. In particular, let T be a monotone map between ordered vector spaces with continuity assumptions satisfying a finite disjointness preserving property (if the infimum of $\{f_i\}$ is zero for positive f_i then the infimum of $\{T(f_i)\}$ is zero) and an orthogonally additive property (if the infimum of $f > 0$ and $g > 0$ is zero then $T(f+g) = T(f)+T(g)$). It is established that for Dedekind complete Banach lattices, this is equivalent to a functional representation, namely that T is an appropriate real-valued function composed with a composition operator. With somewhat modified conditions, an analogous result is obtained for a general class of function spaces. Consequences for bijections are established.