Logic Seminar

Monotone T-convex T-differential fields
Nigel Pynn-Coates (The Ohio State University)

Abstract: Let $T$ be a complete, model complete, power bounded $o$-minimal theory extending the theory of real closed fields. A $T$-convex $T$-differential field is an expansion of a model of $T$ by a valuation and a derivation, each of which is compatible with the $o$-minimal structure, the former in the $T$-convex sense of van den Dries–Lewenberg and the latter in the sense of Fornasiero–Kaplan. When $T$ is the theory of the real field with restricted analytic functions, we can expand an ordered differential Hahn field to a $T$-convex $T$-differential field, in which case the derivation is monotone, i.e., weakly contractive with respect to the valuation (monotone differential Hahn fields were studied earlier by Scanlon and Hakobyan).

I will describe joint ongoing work with Kaplan on monotone $T$-convex $T$-differential fields, achieving among other results an Ax–Kochen/Ershov type theorem for such structures. A key step is isolating an appropriate analogue of henselianity in this setting.