

# A Wadge hierarchy for second countable spaces

Yann Pequignot

December 23, 2013

Wadge reducibility provides a rich and nice analysis of Borel sets in Polish zero dimensional spaces. However, outside this framework, reducibility by continuous functions was shown to be ill behaved in many important cases.

We define a notion of reducibility for subsets of a second countable  $T_0$  topological space based on the notions of *admissible representations* and *relatively continuous relations*. This reducibility can be seen as a generalisation of Wadge reducibility outside of the zero dimensional framework, in the sense that it agrees with Wadge reducibility on zero dimensional spaces.

However this reducibility extends the nice properties of the Wadge reducibility far beyond the class of zero dimensional Polish spaces. In particular, on the real line  $\mathbb{R}$  and on the Scott Domain  $\mathcal{P}(\omega)$  it is a semi wellorder on Borel sets and it refines the classical Borel classes and Kuratowski-Hausdorff difference hierarchies.