

# NON-STANDARD METHODS AND REVERSE MATHEMATICS

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In this talk, I will survey some recent works of our group (Yamazaki, Sakamoto, Yokoyama and myself) on non-standard analysis accommodated to weak second order arithmetic. Our proof technique is essentially based on a theorem due to myself [1] that every countable non-standard model of  $WKL_0$  has a proper initial part isomorphic to itself. Its applications include the Cauchy-Peano theorem, the existence of Haar measure and the Jordan curve theorem. A non-standard method for  $ACA_0$  is also discussed.

[1] K. Tanaka, *The self-embedding theorem of  $WKL_0$  and a non-standard method*, Annals of Pure and Applied Logic, vol.84, 1997, pp.41-49.

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