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Ackermann Function and Reverse Mathematics.

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In 1928, Ackermann [1] defined one of the first examples of recursive but not primitive recursive functions. Later in 1935, Rózsa Péter [5] provided a simplification, which is now known as Ackermann or Ackermann-Péter function. The totality of Ackermann-Péter function is an interesting subject in the study of fragments of first order arithmetic. Kreuzer and Yokoyama [4] prove that the totality of Ackermann-Péter function is equivalent to a Σ_3-proposition called $P\Sigma_1$. And $P\Sigma_1$ has played important roles in reverse mathematics in recent years. We will see some examples in this talk, including some joint works [2, 3] of the speaker and logicians in Singapore.

[1] Ackermann, Wilhelm, *Zum Hilbertschen Aufbau der reellen Zahlen*, ***Mathematische Annalen***, 99(1):118–133, 1928.

[2] Chong, Chitat and Li, Wei and Wang, Wei and Yang, Yue, *On the strength of Ramsey's theorem for trees*, ***Advances in Mathematics***, 369:107180, 39 pp, 2020.

[3] Chong, Chitat and Wang, Wei and Yang, Yue, *Conservation Strength of The Infinite Pigeonhole Principle for Trees*, ***Israel Journal of Mathematics***, to appear, *https://arxiv.org/abs/2110.06026.*

[4] Kreuzer, Alexander P. and Yokoyama, Keita, *On principles between Σ_1- and Σ_2-induction, and monotone enumerations*, ***Journal of Mathematical Logic***, 16(1):1650004, 21 pp, 2016.

[5] Péter, Rózsa, *Konstruktion nichtrekursiver Funktionen*, ***Mathematische Annalen***, 111(1):42–60, 1935.