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Reverse math and the game-theoretic framework

Hirschfeldt and Jockusch (2016) introduced a two-player game in which winning strategies for one or the other player precisely correspond to implications and non-implications between given Π_1^2 principles over omega-models of RCA_0 . They also introduced a version of this game that similarly captures provability over (full) RCA_0 . We generalize this game for provability over arbitrary subsystems of second-order arithmetic, and establish a compactness argument that shows that certain winning strategies can always be chosen to win in a number of moves bounded by a number independent of the instance of the principles being considered. Our compactness result also generalizes an old proof-theoretic fact due to H. Wang, and has a number of other applications. This is joint work with Denis Hirschfeldt and Sarah Reitzes.