Special Section:
Computability Theory and the Foundation of Mathematics

In Honor of the 60th Birthday of Professor Kazuyuki Tanaka

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This 70-page special section is in honor of the 60th birthday of Professor Kazuyuki Tanaka, of the Department of Mathematics at Tohoku University. The birthday occasion was celebrated at CTFM 2015, a lively conference which took place at the Tokyo Institute of Technology during September 7–11, 2015. The seven papers in this special section are based on talks given during that week. CTFM is an annual series of international conferences on Computability Theory and Foundations of Mathematics. Professor Tanaka is well known, both in Japan and internationally, as a leading researcher, teacher, and promoter of mathematical logic and the foundations of mathematics. His logic research group at Tohoku University is one of the largest and best in Japan.

Five of these papers deal with *reverse mathematics*, a very active direction in foundational research where Tanaka has played an especially important role. Tin Lok Wong discusses model-theoretic aspects of WKL_0 , one of the “Big Five” systems in reverse mathematics, with emphasis on Tanaka’s contributions along two lines of research: self-embedding results, and conservation results. Keisuke Yoshii surveys the work of Tanaka and others on the reverse-mathematical analysis of Gale-Stewart games at low levels of the Borel hierarchy. Walter Dean discusses the prehistory of the modern reverse-mathematical analysis of the Gödel Completeness Theorem, and from this perspective he provides an interesting reappraisal of the Bernays maxim “consistency implies existence.” Gaolin Li, Junren Ru, and Guohua Wu present a reverse-mathematical analysis of Rudin’s Lemma in *domain theory*, a branch of lattice theory which is of great importance for the semantics of programming languages.

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Sakaé Fuchino develops a reverse-mathematical perspective on recent advances in the study of set-theoretic reflection principles.

The other two papers also fall squarely within the wide scope of Tanaka's research interests. Toshio Suzuki surveys Tanaka's work on Boolean AND-OR trees and related developments. Nik Weaver presents a forceful and precise argument in favor of taking the Liar Paradox seriously.

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