

## Problem #100

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*Summary: Design new termination methods based on the gap-embedding theorems of Friedman and Kriz.*

Harvey Friedman [Sim85] modified Kruskal's Tree Theorem to restrict labels that appear along the path between the images of adjacent nodes to what is called *gap embedding*. Whereas Friedman's result applied only to labellings with the natural numbers, Igor Kríž [Kř9] extended it to arbitrary ordinal labellings. See also [Gor90]. The question is whether new and useful termination methods can be based on these gap-embedding theorems. One step in this directions is [Oga95].

This problem is related to Problem #73.

# Bibliography

- [Gor90] L. Gordeev. Generalizations of the Kruskal-Friedman theorems. *Journal of Symbolic Logic*, 55(1):157–181, 1990.
- [Kř89] I. Kříž. Well-quasiordering finite trees with gap-condition. proof of Harvey Friedman’s conjecture. *Ann. of Math.*, 130:215–226, 1989.
- [Oga95] M. Ogawa. Simple gap termination on term graph rewriting systems. In *Theory of Rewriting Systems and Its Application*, pages 99–108, 1995. Research report 918, RIMS, Kyoto Univ, Kyoto., also available at <http://www.brl.ntt.co.jp/people/mizuhito>.
- [Sim85] S.G. Simpson. Nonprovability of certain combinatorial properties of finite trees. In L. A. Harrington, editor, *Harvey Friedman’s research on the Foundation of Mathematics*, pages 87–117. Elsevier Science, 1985.