On periodic decompositions, nonexpansive lines and Nivat's conjecture

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Abstract.

In his Ph.D. thesis, under the guidance of Jarkko Kari, Michal Szabados showed that every low pattern complexity configuration can be decomposed into a finite sum of periodic configurations. For a not fully periodic configuration with a minimal periodic decomposition, that is, a periodic decomposition with the smallest possible number of periodic configurations, any nonexpansive line contains a period of some periodic configuration in the decomposition. Michal Szabados conjectured that the converse also holds. In this talk, we will present recent advances related to Szabados's conjecture as well as some minor progress on Nivat's conjecture, a natural generalization of the Morse-Hedlund Theorem to the two-dimensional case.