Topological and algebraic reducibility for patterns on trees

Lluís Alsedà[1], David Juher[2], Francesc Mañosas[3]

[1] *Departament de Matemàtiques, Edifici Cc, Universitat Autònoma de Barcelona, 08913 Bellaterra (Barcelona), Spain.*
E-mail: alseda@mat.uab.cat

[2] *Departament d'Informàtica i Matemàtica Aplicada, Universitat de Girona, Lluís Santaló s/n, 17071 Girona, Spain.*
E-mail: david.juher@udg.edu

[3] *Departament de Matemàtiques, Edifici Cc, Universitat Autònoma de Barcelona, 08913 Bellaterra (Barcelona), Spain.*
E-mail: manosas@mat.uab.cat

We extend the classical notion of block structure for periodic orbits of interval maps to the setting of tree maps and study the algebraic properties of the Markov matrix of a periodic tree pattern having a block structure. We also prove a formula which relates the topological entropy of a pattern having a block structure with that of the underlying periodic pattern obtained by collapsing each block to a point, and characterize the structure of the zero entropy patterns in terms of block structures. Finally, we prove that an n-periodic pattern has zero (positive) entropy if and only if all n-periodic patterns obtained by considering the k-th iterate of the map on the invariant set have zero (respectively, positive) entropy, for each k relatively prime to n.