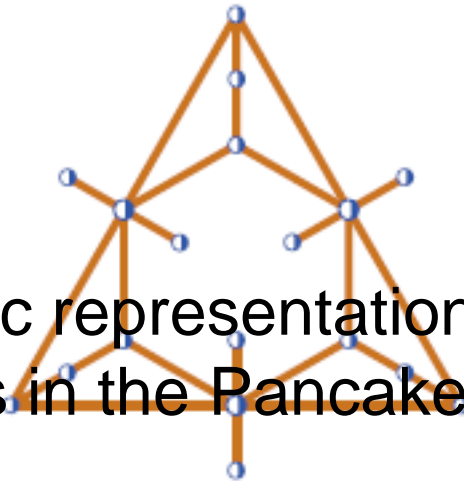


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Algebraic representation of small cycles in the Pancake graph



Content :

The Pancake graph P_n which is well known because of the open Pancake problem is the Cayley graph on the symmetric group with the generating set of all prefix-reversals. It was proved [A. Kanevsky, C. Feng, *Paral. Comput.* 21 (1995) 923-936; J.J. Sheu, J.J. M. Tan, K.T. Chu, *Proc. 23rd Workshop on Comb. Math. Comput. Theory*, 2006, 85-92] that cycles of length l , $6 \leq l \leq n!$, can be embedded in P_n , $n \geq 3$. In this paper we give an explicit description of all cycles of small length l , $6 \leq l \leq 9$, via products of generating elements. In particular, for $l=7$ it is proved that each of vertices of P_n , $n \geq 4$, belongs to $7(n-3)$ cycles of length seven, and there are exactly $n!(n-3)$ different cycles of length seven in the graph. Similar results are given for other cycles. We also discuss a general case.

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