MAXIMAL TRANSITIVE SUBTOURNAMENTS OF A DIGRAPH: THE τ OPERATOR

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We introduce the *maximal transitive subtournament* (or the *tt-clique*) operator τ of a digraph D. The τ operator of a digraph D is the intersecting digraph of its tt-cliques preserving the orientation.

This operator is a corresponding notion to the widely studied *clique operator* of graphs (the intersection graph of the maximal complete subgraphs of a given graph). On the other hand, the τ operator is the generalization of the well-known line digraph of a digraph D.

We also define convergent, periodic and divergent digraphs over the τ operator. For the basics on (di)graph operators see [2].

Some basic properties of the operator are studied and we exhibit infinite families of convergent and divergent digraphs under τ. It is proved that for every $p \in \mathbb{N}$ there exists an infinite family of finite τ-periodic digraphs of period p.

References

[1] M. Gutiérrez, B. Llano and G. Sánchez-Vallduví, The maximal transitive subtournaments of a digraph: the τ operator, Matemática Contemporânea 55 (2023), 57–66.

[2] E. Prisner. *Graph dynamics*, Longman, Harlow, 1995.