The paper is to formalize the notion of the number of twists in a chain in a directed graph and then to generalize a theorem on strongly connected graphs to graphs. A chain in a directed graph is obtained by putting a pointer at a vertex and moving it in the direction or against the direction of a connected sequence of arcs to another vertex. Each change of direction is a twist, hence the notion of a k-twisted chain. Likewise, a 2k-twisted graph is a graph such that for every pair of vertices there exists a 2k-twisted closed chain through the given vertices. It is shown that for a 2k-twisted graph the set of algebraic 2k-twisted cycles is an integral spanning set for the integral flow module of the graph. Since a graph is 0-twisted if and only if it is strongly connected, the result generalizes the well-known theorem that there is a basis for the flow space of a strongly connected graph consisting of algebraic circuits.

Reviewer: Wai-Kai Chen

MSC:
- 05C20 Directed graphs (digraphs), tournaments
- 05C38 Paths and cycles
- 90B10 Deterministic network models in operations research

Keywords:
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References:

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