This paper poses a problem in combinatorics coming from logic. The authors solve an important conjecture in digraphs from Chloe Urbanski:

The absence of one-way cycles characterizes majority digraphs.

Majority digraphs are finite simple digraphs such that there exist finite sets $A_v$ for the vertices $v$ with the property that $uv$ is an arc iff $|A_u \cap A_v| > \frac{1}{2}|A_v|$, i.e., *most of $A_u$ is in $A_v$*. The characterization of sound inferences involving *most* is an interesting problem in logic.

The authors generalize the problem by changing $\frac{1}{2}$ to any real number $\alpha \in (0, 1)$ and apply the characterization result to the logic of the assertion that *most* $X$ are $Y$, developing the logic language $L_{\text{most}}$ and proving that the satisfiability problem for this language is NP-complete.

The results in this excellent paper are very nice and the reformulation of the logic problem to digraph theory is very interesting.

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References


*Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.*