

**MR3513532** 05C62 03B65

**Lai, Tri** (1-MN-MA); **Endrullis, Jörg** (NL-VUAM-NDM);

**Moss, Lawrence S.** (1-IN)

**Majority digraphs.** (English summary)

*Proc. Amer. Math. Soc.* 144 (2016), no. 9, 3701–3715.

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  $|A_u \cap A_v| > \frac{1}{2}|A_u|$ , 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  $\mathcal{L}(\text{most})$  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.

*José Ramón Portillo*

---

### References

1. Jörg Endrullis and Lawrence S. Moss, *Syllogistic Logic with “Most”*, in V. de Paiva et al (eds.) Proceedings, Workshop on Logic, Language, Information and Computation (WoLLIC’ 15), 2015, 215–229. [MR3440601](#)
2. Chloe Urbanski, personal communication, 2013.

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