The class UMU is the class of propositional formulas in CNF which are a union of minimally unsatisfiable formulas (MU formulas). The structural complexity of UMU formulas depends essentially on the type and degree of intertwining of the MU subformulas. Starting from the class of formulas that consist only of clause- or variable-disjoint minimal unsatisfiable subformulas, various UMU subclasses given by weakening of these conditions are studied.

Generalizing an idea from an earlier paper of the author and Zhao [1], a characterization of UMU formulas by whether they allow transformation into a MU formula by adding literals and/or clauses is investigated. It can be shown that the simplicity of constructing such extensions correlates with the degree of intertwining of the MU subformulas. For UMU formulas, however, only extensions of exponential size in the worst case can be given. The question of the existence of short MU combinations of MU-formulas obtained by adding literals and clauses remains open.

References

[1] H. Kleine Büning and X. Zhao, Extension and equivalence problems for clause minimal formulae, Ann. Math. Artif. Intell. **43** (2005), no. 1-4, 295–306; MR2123490