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*Level Hypergraphs*

Given a hypergraph  $H = (E_x, \dots, E_m)$ , its level-hypergraph  $L_H$  is the result of identifying all vertices which belong to exactly the same edges. This new hypergraph has the same edge-structure as the original one, but may have less vertices. The tool makes it possible to emulate known theorems given in terms of order or rank; the new results are stated in terms of edge-structure, and usually apply to different classes of hypergraphs than the original statements, though there are some improvements on known results.

On the other hand, the study of several characteristics of a given hypergraph  $H$  is simplified, since many hypergraph invariants are preserved. For example:  $H$  is simple if, and only if,  $L_H$  is simple;  $H$  has repeated edges if, and only if,  $L_H$  does too;  $\nu(H) = \nu(L_H)$ , where  $\nu(H)$  is the maximum cardinality of a matching in  $H$ ; the minimum cardinality of a transversal set, the maximum cardinality of a transversal set not contained properly in other transversal, and the minimum cardinality of a strongly stable set are also equal in both  $H$  and  $L_H$ . Moreover,  $H$  is balanced (respectively totally balanced) if, and only if,  $L_H$  is balanced (respectively totally balanced);  $H$  is unimodular (respectively strongly unimodular) if, and only if,  $L_H$  is unimodular (respectively strongly unimodular), and  $\Lambda(H) = \Lambda(L_H)$ ,  $\lambda(H) = \lambda(L_H)$ .

## References

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