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Squarability of Rectangle Arrangements

We study when an arrangement of axis-aligned rectangles can be transformed into an arrangement of axis-aligned squares in \mathbb{R}^2 while preserving its structure. We found a counterexample to the conjecture of J. Klawitter, M. Nöllenburg and T. Ueckerdt whether all arrangements without crossing and side-piercing can be squared. Our counterexample also works in a more general case when we only need to preserve the intersection graph and we forbid sidepiercing between squares. We also show counterexamples for transforming box arrangements into combinatorially equivalent hypercube arrangements. Finally, we introduce a linear program deciding whether an arrangement of rectangles can be squared in a more restrictive version where the order of all sides is preserved. Joint work with Matěj Konečný, Stanislav Kučera, Michal Opler, Štěpán Šimsa and Martin Töpfer.