Origami Construction of a Morley's Triangle with Automated Proof

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Abstract

We show origami construction of a Morley's triangle together with the automated proof of Morley's theorem and its generalization. Morley's theorem states that the three points of intersection of the adjacent interior trisectors of the angles of any triangle form an equilateral triangle. The whole process of origami construction and subsequent automated proof of the correctness of the intended construction is performed in a streamlined fashion by our Computational Origami System. We show that the computational origami system not only simulates origami construction to a precision of numeric and symbolic computation, but has the power of symbolic constraint solving and proving. The automated proof uses Groebner bases computation, and took over 16 hours to prove the generalized Morley's theorem.