

# Improving convex-dense bivariate factorization

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We propose a new algorithm for factoring a bivariate polynomial  $F \in \mathbb{K}[x, y]$  which takes fully advantage of the geometry of the Newton polygon of  $F$ . Under some non degeneracy hypothesis, the complexity is  $\tilde{O}(Vr_0^{\omega-1})$  where  $V$  is the volume of the polygon and  $r_0$  is its minimal lattice length, an easy-to-compute upper bound for the number of indecomposable Minkovski summands. The proof is based on a new fast factorization algorithm in  $\mathbb{K}[[x]][y]$  with respect to an augmented valuation, a result which has its own interest.