Neriman Tokcan* (tokcan2@illinois.edu). Relative Ranks of Binary Forms.

Suppose \( f(x, y) \) is a binary form of degree \( d \) with coefficients in a field \( K \subseteq \mathbb{C} \). The \( K \)-rank of \( f, L_K(f) \), is the smallest number of \( d \)-th powers of linear forms over \( K \) of which \( f \) is a \( K \)-linear combination. We prove that for \( d \geq 5 \), there always exists a form of degree \( d \) with at least three different ranks over various fields. We also find lower bounds for \( \mathbb{C} \)-rank and \( \mathbb{R} \)-rank of binary forms depending on their factorizations. (Received September 20, 2016)