

### Fractional parts of binary forms

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2022년 5월 12일(목) 14시-16시

과학관 221호

**Abstract:** We obtain bounds on fractional parts of binary forms of the shape

$$\Psi(x, y) = \alpha_k x^k + \alpha_l x^l y^{k-l} + \alpha_{l-1} x^{l-1} y^{k-l+1} + \cdots + \alpha_0 y^k$$

with  $\alpha_k, \alpha_l, \dots, \alpha_0 \in \mathbb{R}$  and  $l \leq k-2$ . By exploiting recent progress on Vinogradov's mean value theorem and earlier work on exponential sums over smooth numbers, we derive estimates superior to those obtained hitherto for the best exponent  $\sigma$ , depending on  $k$  and  $l$ , such that

$$\min_{\substack{0 \leq x, y \leq X \\ (x, y) \neq (0, 0)}} \|\Psi(x, y)\| \leq X^{-\sigma + \epsilon}.$$



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**주최: 4단계 BK21 수리과학 및 계산교육 연구단**