1046-11-2094 **Erich Kaltofen*** (`kaltofen@math.ncsu.edu`), Dept. Mathematics, Campus Box 8205, NCSU, Raleigh, NC 27695. *Rump's model problem and the computer search for records in number theory.* Preliminary report.

Rump's model problem is the problem to globally minimize real polynomial product 2-norms:

$$\mu_n = \min\{\|PQ\|_2 \mid P, Q \in \mathbb{R}[z], \|P\|_2 = \|Q\|_2 = 1 \\ \text{and } \deg(P) = \deg(Q) = n-1\}.$$

In our ISSAC 2008 paper we compute upper bounds for μ_n for $n \leq 79$ and certified lower bounds for $n \leq 14$. It is possible from the optimal polynomials P and Q to compute integer polynomials with good lower bounds for the maximal single factor height ratio

$$\begin{aligned} c_n = \max_{F,G}\ & \chi_n \\ \text{s. t. }\ & \min(\|F(z)\|_\infty, \|G(z)\|_\infty) = \chi_n \|F(z)\cdot G(z)\|_\infty \\ & F, G \in \mathbb{Z}[z] \textit{ irreducible}, \deg(F) + \deg(G) = n \end{aligned}$$

and integer polynomials with Mahler measure near 1 [Lehmer's problem]. My talk will describe our computational and search strategies, including those suggested by David Boyd and Lihong Zhi, and what polynomials I have found so far. (Received September 17, 2008)