Texas Tech University - Department of Mathematics and Statistics
Seminar in Applied Mathematics

On the best constant in Poincaré inequality

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ABSTRACT. Let $1 \le p, q, r \le \infty$. We consider the following problem: to find the sharp constant in the generalized Poincaré inequality

$$\lambda_{pqr} = \min \frac{\|y'\|_{L_p[-1,1]}}{\|y\|_{L_q[-1,1]}}; \qquad \int_{-1}^{1} |y(t)|^{r-2} y(t) \, dt = 0 \qquad (1)$$

(for $r = \infty$ the last relation is understood in the limit sense).
Problem (1), so as its particular cases and some equivalent problems, arise, mostly for $r = 2$, in various fields of mathematics. We mention the problem of optimality of some goodness-of-fit criteria in non-parametric statistics and the estimation of critical values in the Lagrange problem.