Problem 1(Viktoria Shuravleva) Let the sequence x_n satisfies the condition

$$lim_{n\to\infty} inf(x_{n+1} - x_n) > 0$$

then $\{\xi x_n\}$ is uniformly distributed modulo 1 for almost all real ξ. (Weil's theorem) Can we relax the condition $lim_{n\to\infty} inf(x_{n+1} - x_n) > 0$?

Problem 2(from the work of Bourgain, Konyagin, Shparlinski) Let

$$A = \{\frac{r}{s} : 1 \leq r, s \leq Q\}.$$

Then

$$|A^{(k)}| > exp(-C(k)\frac{\log Q}{(\log\log Q)^{1/2}})|A|^k,$$

for some function $C(k)$ depending only on k. Here

$$A^{(k)} := \{a_1 * \ldots * a_k : a_i \in A\}.$$

Can we refine the constant $1/2$ to $1/2 + \delta$?

Problem 3(Fedor Nilov) Let $k < n$ - some positive integers. For what parameters k, n there $\exists$ the set $A \subset T^2$ where T^2 is torus, with the following conditions

$$|A| = n,$$

for any

$$x_1, ..., x_k \in A$$

there exists $x \in A, x \neq x_i, i = 1, ..., k$ and

$$x_1 + ... + x_k + x = 0$$

Problem 4(one estimate) Let A, B, C - some finite subsets of $\mathbb{R}$. There is an estimate

$$|A + AC||B + BC| >> |A||B||C|.$$

What can be said about this estimate, can it be improved for example?

Problem 5 Let

$$F(n, T) := \sum_{d|n; d\leq T} \mu(d).$$

Can we get an upper estimate for $max_n F(n, T)$ like this

$$max_n F(n, T) = o(T)?$$