

## A FEW ENCOUNTERS WITH MISCHA COTLAR AS I REMEMBER THEM

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I have had a very few but remarkable encounters with Mischa Cotlar. For the first time, I met him personally quite recently - about 20 years ago (see below about that) - much later than I met his mathematics.

The latter occurred at the early stage of the St.Petersburg (Leningrad) seminar in analysis. I think, it was Seva Dyn'kin who discovered for us the famous Cotlar's Lemma on almost orthogonal families of operators. Somewhere in the late 1960ies (or early 1970ies) he presented it on the seminar. Usually extremely critical towards the results of somebody else, Dyn'kin was totally enthusiastic showing to us, all novices in singular integrals, how and why this fact must become a cornerstone of  $L^2$  theory of singular integral operators. Now, this approach is presented in any textbook on the harmonic analysis, and many people are (or was) involved in generalizations and applications of Cotlar's Lemma. (Elia Stein's noncommutative form became especially popular. The Lemma can also find important applications in mathematics far from singular operators - for example, in free (Carleson) interpolation theory, as is shown in my recent book "Operators, Functions, and Systems").

My next impression on Mischa's mathematics is dated about 10 years later when his great series of papers with Cora Sadosky on Generalized Toeplitz Kernels (GTK) started to appear. On the age when all people involved in "weighted analysis" was exited with the Muckenhoupt-type approach (which is efficient for real variable applications), the Cotlar-Sadosky's idea to develop Helson-Szegö classical techniques was really revolutionary. They immediately obtained important applications of the GTK theory in a variety of domains where complex analysis language is more appropriate than the real analysis one (scattering theory, Hankel and Toeplitz operators, dilation theory..., but also singular integrals for so important problems as the famous two-weighted estimates). This Cotlar-Sadosky series appeared almost simultaneously with the well-known Krein's school achievements (Adamyan-Arov-Krein) and the Lax-Phillips approach to the scattering theory, but the GTK theory showed several advantages (as, for example, an important - and growing with time! -efficiency in several complex variables).

One more, and the most emotional, impression on Mischa's mathematics comes to me from my last personal encounter with him, about Summer 2001, in Washington, D.C.. This inspiring audience was arranged by Cora Sadosky. This time, being already about 90 years old, Mischa delivered me a mathematical lesson of 3 hours long (!) speaking on his new program of "discretizing of the operator theory". I remember that he started saying that he is trying to describe a yet inexisted technique for an already inexisted theory (he referred to the fact that, say, the theory of self-adjoint operators, yes, exists, but just "operator theory" has no common techniques). Then, he rapidly drew a picture of a new approach for studying general operators on a Hilbert space via basis representations, with respect to varying bases, with elements of a non-commutative scaling process. Many quantitative particular questions related to possible realizations of his scheme and recalling some problems from the finite section method, or questions around the Kadison-Singer problem, were really exiting.

Personally, I met Mischa for the first time as late as the middle of the 1980ies when I, finally, got a permission to make a university trip abroad. (Being in the Soviet Union, I was during all hard soviet time in the "not-allowed-to-leave" category ("nevyezdnoi")). Misha invited me to visit Caracas, and with a short stop in Cuba, I arrived to Venezuela. I expected that a person with Mischa's mathematical creativity is surrounded by a vast cercle of pupils (as it was in Russia in similar cases)..., but I found a rather modest seminar, where Mischa spreaded his ideas. I remember however his remarkable generosity and enthousiasm when working with the young people. Even speaking on a Venezuela incredible social turmoil he was biblically indulging: "Yes, there are a lot of inconveniencias in our life here, but they are simply a very young people, they have already no knowledge, and, finally, they will learn how to live...".

For my way back to St.Petersburg (Leningrad at the time), Mischa and Yanni came to the airport in person to say me good-by. The last minutes lasted quite long, many things were anew discussed, from mathematics to Mischa's and Yanni's russian roots, and finally I pointed me to the pass control. At the very last moment, being already at the border line, I gave a last glimpse on the Cotlars and remarked that Mischa hides something behind his back. Approaching rapidly, I asked what is it, and he answered with an excusing smile that he thought to pass with me a small gift to his russian friend with whom he has no met many decades, but finally, he saw my luggage (quite modest...) and did not dare to ask me to take to my pocket this tiny box... Sic!