

Some Comments on Sobolev and Schwartz

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I think that we must distinguish between the logical and historical aspects of distribution theory, as well as between romanticism and classicism in mathematics.

In a sense, distribution theory was completed by the mid 1950s—it solved the main problem under attack by the Malgrange–Ehrenpreis theorem. From this perspective we may see that the key ingredients of success are the definition of generalized derivative based on the transpose of the classical derivative over compactly supported smooth functions, the Schwartz space of tempered distributions as the framework for the Fourier transform, and the Sobolev spaces and embedding theorems, bridging gaps from fundamental to classical solutions. We know for certain who originated these ideas that settled the matter.

Time has proved that Schwartz gave an ideal form for presenting distribution theory. His approach is followed in practically all present-day textbooks. The theory of distributions is a jewel in the treasure trove of mathematics. The theory of Sobolev spaces is still a diamond in the rough.

Priority disputes make curious anecdotes but have the status only of incidents in the history of human folly. The implication that Hadamard was a traitor and/or industrial spy reminds me of the very recent ludicrous claims that Pythagoro-

ras was a traitor and/or industrial spy hunting the revelations and discoveries of Toth.

Schwartz's unfortunate remarks about Sobolev and the absence of a Russian translation of the book of Schwartz are nothing but petty events, similar to the priority quarrels between Newton and Leibniz. By the way, I am very happy that Sobolev never wrote an impolite word about Schwartz, but I still feel sorry that the book of Schwartz is unavailable in Russian, which looks like an otiose revenge.

Aside from some personal pettiness among the greatest figures in our profession, I see the impact of one real difference in approach to mathematical problems: the difference between romanticism and classicism. Between the classical Euclid and the romantic Diophantus, the classical Newton and the romantic Leibniz, the classical Bolyai and the romantic Lobachevskii, the classical Hilbert and the romantic Poincaré, the classical Serre and the romantic Arnol'd: there are two different visions of mathematics. Clearly, this reflects something intrinsic in our science.

Everyone now smiles at the priority disputes over Calculus. We are proud of both Newton and Leibniz. Everyone will smile at the priority issues concerning distribution theory, the Calculus of today. Everyone will be proud of both Sobolev and Schwartz.

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