It would be not enough to say that Ludwig Dmitrievich Faddeev works in the field of mathematical physics. Rather he is one of the creators of modern mathematical physics. In the late 50s when he started his scientific career, different branches of what we now call mathematical physics were essentially unrelated. It should be taken into account, for example, that at that time Quantum Mechanics was younger than String Theory is today.

For me the main feature of Faddeev as a scientist is his belief that mathematical beauty is the most important guiding principle in physics. For that reason I consider him as a great idealist. Certainly Faddeev had predecessors who shared the same point of view. He himself cites in that respect P.A.M. Dirac, H. Weyl and V.A. Fock.

Our generation takes many things for granted. We know that Quantum Mechanics is a deformation of Classical Mechanics, we understand the importance of Hamiltonian Methods in that respect, we know that the functional integral is not just a fancy idea of Feynman but an important tool in Quantum Field Theory, that geometry plays a role in Quantum Field Theory along with the theory of Lie groups, that classical nonlinear equations admit non-trivial solutions which give rise to new particles after quantization, and hence it is not necessary for every particle to correspond to its own field. All that was taught to us, but for Faddeev this was a result of personal development. He had to understand all these matters himself and often in a hostile environment. That is why he understands them deeper than we do.

Let me describe the main works of Faddeev. He started with the study of Quantum Mechanics in the framework of functional analysis as was usual at the time. The PhD thesis of Faddeev is devoted to the inverse problem for one-dimensional Schrödinger operator. Profound knowledge of the subject turned out, much later, to be of central importance in relation to the Korteweg-deVries equation. I think the main discovery of his early work was the recognition of the importance of functional determinants. I remember, at a later point, when I was surprised that the formulae for the form factors in integrable models are given by determinants, Faddeev told me: "Solution to any good problem is given by a determinant." Certainly, this was a joke, but it is true that we find several remarkable determinants in Faddeev's works.

Then comes the three body problem with the famous Faddeev's equations. This work combines an elegant original idea with very sophisticated techniques. Faddeev himself considered this work as a mathematical solution of a difficult physical problem. Actually its importance is much wider: all computer calculations needed for applications today are done using Faddeev's equations.

The 60s was a period of very diverse and successful scientific activity for Faddeev. It is difficult to establish an exact chronology because at that time he was working very actively in many different fields. For an ordinary person it would be impossible to deal with such different matters simultaneously. I have already said that I consider mathematical beauty as the main source of Faddeev's inspiration in physics, but the opposite is also true: believing that physics is described by beautiful mathematics he naturally comes to the conclusion that a good problem in physics must provide new insight into pure mathematics. A realization of this idea is presented by his remarkable derivation of the Selberg trace formula by the methods of scattering theory. Determinants once again! The theory of automorphic functions is so far from his original area that once again he had to understand the subject by himself, and it is impressive how deep and clear this understanding is. Yet another work from the same period concerns the three-dimensional inverse problem. In all the years that followed very little was added to Faddeev's work on the subject, and it remains a rare example of elegance in mathematical physics.

Now comes the jewel of the scientific career of Faddeev: quantization of the Yang-Mills theory. I remember long ago C. Itzykson told me: "We were doing the usual perturbation theory, Faddeev taught us the functional integral." I think this is the main discovery of Faddeev in Quantum Field Theory: the functional integral and the measure of integration in it should be taken seriously. This discovery led him (with V.N. Popov) to the discovery of one more determinant which will surely stay in Quantum Field Theory forever.

In the 70s Faddeev was one of the first to recognize the importance of the newly discovered solutions of non-linear PDE — solitons. He was not interested in applications to hydrodynamics, rather to Quantum Field Theory, being convinced that solitons would allow for the reduction of the number of fields in Lagrangians. The program which he developed with his colleagues and students was logically clear: to develop the Hamiltonian approach as the first step towards quantization, to find integrable relativistic models, to perform semi-classical quantization, to quantize exactly. All this was done during the 70s-80s. As a result, unexpected connections have been found with works by H. Bethe, C.N. Yang, R. Baxter, and an entire new field of mathematics, the theory of Quantum Groups, appeared.

In the early 70s Faddeev started to look for multidimensional solitons. He returned to this problem and to Yang-Mills theory in the 90s, and has been working in this direction up till the present time. I wish him many new achievements and I hope everybody will join me in echoing this sentiment. Congratulations Ludwig Dmitrievich!

Fyodor Smirnov