Last 20-25 years the theory of analytic functions of several complex variables had many applications in Mathematical physics, especially in quantum field theory. On the other hand the quantum field theory found oneself as a source of many nontrivial problems in the theory of analytic functions and essentially influenced its development. This situation reminds somewhat one of 40-50 years ago when rapid development of the hydro-aerodynamics and the theory of elasticity stimulated a progress of the theory of analytic functions of one complex variable.

In quantum field theory (as in many other branches of Mathematical physics) the physical quantities arise as boundary values of some classes of analytic functions holomorphic in some "primitive" domains defined by axioms. The problem is to construct the envelope of holomorphy for "primitive" domains and the corresponding integral representations which would evaluate values of holomorphic function by means of its values on the "essential" part of the boundary. By such a way it is possible in principle to obtain so-called (many-dimensional) dispersion relations between quantities observed in experiments. Realization of this programme in the frame of some system of axioms would give firstly a possibility to verify experimentaly the consistency of the system of axioms considered and secondly would lead to an
analytical approach which would capable to predict results of experiments.

In this talk I do not have a possibility to expose sufficiently completely this line of problems. I only expose here briefly several main results from the theory of holomorphic functions of several complex variables which serve as a mathematical tool in many problems of mathematical physics. I keep in mind the following four problems.

1. The "edge of the wedge" theorem by Bogoliubov;
2. The "C-convex hull" theorem (or the "double cone" theorem);
3. The "finite covariance" theorem;
4. Holomorphic functions with positive real part in tube domains over proper cones.

We denote points of $C^n = \mathbb{R}^n + i\mathbb{R}^n$, $z = x + iy = (z_1, z_2, \ldots, z_n)$; $H(D)$ is the space of functions holomorphic in a domain $D$ with the topology of uniform convergence on each compact subset of $D$; $H(D)$ is the envelope of holomorphy of a domain $D$; $C, C', \ldots$ are cones in $\mathbb{R}^n$ with the vertex at $O$; $T^C = \mathbb{R}^n + iC$ is the tube over a cone $C$; $pr. C = C \cap S^{n-1}$ ($S^{n-1}$ is the unit sphere); $C' \subseteq C$ means that $pr. C' \subset pr. C$; $C^* \何必 [x : (x, y) \geq 0, \forall y \in C]$ is the conjugate cone for the cone $C$. If $int C^* \neq \emptyset$ the cone $C$ called proper one:

1. The "Edge of the wedge" theorem by Bogoliubov.

In 1956 N.N. Bogoliubov discovered and proved a remarkable theorem called now as Bogoliubov's "edge of the wedge" theorem [1].