

The Role of Power Series Spaces in the Structure Theory of Frechet Spaces - I

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Abstract

The main purpose of this series will be to demonstrate the central role played by power series spaces in the structure theory of Fréchet spaces. A classical theorem of Mityagin states that if a nuclear Fréchet space has a basis, then it is canonically isomorphic to a Köthe space. The really concrete examples of nuclear Köthe spaces are power series spaces of infinite or finite type. Also, certain Fréchet spaces of functions are isomorphic to power series spaces, such as the spaces of functions holomorphic on a polydisk or entire functions of several variables, spaces of null solutions of an elliptic partial differential operator.

Subspaces and quotient spaces of stable power series spaces of finite or infinite type were characterized completely by Vogt in terms of diametral dimension and DN- and Ω -type invariants. We will discuss and use these theorems in subsequent developments, which will be about local imbedding, local quotients and complemented subspaces of Fréchet spaces.