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ON DUAL SPACES OF LOCALLY CONVEX SPACES DEFINED BY OPERATOR IDEALS

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There is a well known theorem proved by Grothendieck which states that the strong dual space of each nuclear metrizable locally convex space is also nuclear. If one replace the class $\mathcal{N}$ of the nuclear operators used in the definition of the nuclear spaces by another ideal $\mathcal{A}$ of linear bounded operators between Banach spaces then the resulting locally convex spaces are called $\mathcal{A}$ - spaces (c.f./3/). Now, the question arises under which assumptions on $\mathcal{A}$ a theorem like the called above one is true. There is the following result:

Theorem (c.f./2/). Let $\mathcal{A}$ be an injective, symmetric, and complete metric ideal of operators, the topology of which is given by a countable increasing system $\{\alpha_n\}$ of quasinorms α_n. Then the strong dual of each metrizable $\mathcal{A}$- space is also an $\mathcal{A}$ - space.

For the definitions used in this theorem see the references. This theorem can be used for nuclear, strongly nuclear, Schwartz- , infra-Schwartz- spaces and for numerous other classes of l.c.s. The theorem which can be found in /2/ is somewhat stronger.

References

/1/ Jarchow, H.: Nuclear Locally Convex Spaces, Lecture Note 13, University of Maryland 1976.

/2/ Junek, H.: On Dual Spaces of Locally Convex Spaces Defined by Operator Ideals (to appear).

/3/ Pietsch, A.: Ideals of Operators on Banach Spaces and Nuclear Locally Convex Spaces, Proc.III.Symp.Gen.Topology, Prague 1971