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IMBEDDING OPERATORS IN SOBOLEV-LIONS SPACES AND APPLICATIONS

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ABSTRACT

The continuity and compactness of imbedding operators in Sobolev-Lions type spaces derived. The anisotropic weighted type spaces

$$W_{p,\gamma}^{l}\left(\Omega;E_{0},E\right)=W_{p,\gamma}^{l}\left(\Omega;E\right)\cap L_{p,\gamma}\left(\Omega;E_{0}\right),$$

is considered, where $l=(l_1,l_2,...l_n)$, E_0 and E are two Banach spaces; E_0 is continuously and densely embedded into E. Several conditions are found that ensure the continuity and compactness of embedding operators in these spaces in terms of interpolations of E_0 and E. The most regular class of interpolation space E_α, between E_0 and E are found such that the mixed differential operators D^α are bounded from $W_{p,\gamma}^{l}\left(\Omega;E_{0},E\right)$ to $L_{p,\gamma}\left(\Omega;E_{\alpha}\right)$. These results are applied to anisotropic partial differential-operator equations and infinity systems of quasi elliptic equations with variable coefficients to obtain conditions that guarantee the maximal $L_{p,\gamma}$ regularity.

Key Words: Banach -valued function spaces; Imbedding in Sobolev-Lions type spaces; Separable boundary value problems; Operators with discrete spectrum: Differential-operator equations; Operator-valued multipliers; Interpolation of Banach spaces; Semigroup of operators.