COMPENSATED COMPACTNESS IN THE $\mathrm{L}^p - \mathrm{L}^q$ SETTING

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We investigate conditions under which, for two sequences $(\mathbf{u}_r)$ and $(\mathbf{v}_r)$ weakly converging to $\mathbf{u}$ and $\mathbf{v}$ in $\mathrm{L}^p(\mathbf{R}^d;\mathbf{R}^N)$ and $\mathrm{L}^q(\mathbf{R}^d;\mathbf{R}^N)$, respectively, $1/p + 1/q \leq 1$, a quadratic form $q(\mathbf{x};\mathbf{u}_r,\mathbf{v}_r) = \sum_{j,m=1}^N q_{jm}(\mathbf{x}) u_{jr} v_{mr}$ converges toward $q(\mathbf{x};\mathbf{u},\mathbf{v})$ in the sense of distributions. The conditions involve fractional derivatives and variable coefficients, and they represent a generalization of the known compensated compactness theory. The proofs are accomplished using a recently introduced H-distribution concept. We apply the developed techniques to a nonlinear (degenerate) parabolic equation.

This is a joint work with D. Mitrović.

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