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On very weak solutions of a class of nonlinear elliptic systems

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Abstract: In this paper we prove a regularity result for very weak solutions of equations of the type $-divA(x,u,Du) = B(x,u,Du)$, where A, B grow in the gradient like t^{p-1} and $B(x,u,Du)$ is not in divergence form. Namely we prove that a very weak solution $u \in W^{1,r}$ of our equation belongs to $W^{1,p}$. We also prove global higher integrability for a very weak solution for the Dirichlet problem

$$\{ \ -divA(x,u,Du) = B(x,u,Du) \qquad \text{in } \Omega, u - u_o \in W^{1,r}(\Omega, \mathbb{R}^m).$$

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