

Anna Denkowska
Uniwersytet Ekonomiczny w Krakowie
Piotr Gwiazda
Instytut Matematyczny PAN

On renormalized solutions to elliptic inclusions with nonstandard growth

We study the elliptic inclusion given in the following divergence form

$$\begin{aligned} -\operatorname{div} A(x, \nabla u) &\ni f \text{ in } \Omega, \\ u &= 0 \text{ on } \partial\Omega. \end{aligned}$$

As we assume that $f \in L^1(\Omega)$, the solutions to the above problem are understood in the renormalized sense. We also assume nonstandard, possibly nonpolynomial, heterogeneous and anisotropic growth and coercivity conditions on the maximally monotone multifunction A which necessitates the use of the nonseparable and nonreflexive Musielak–Orlicz spaces. We prove the existence and uniqueness of the renormalized solution as well as, under additional assumptions on the problem data, its boundedness. The key difficulty, the lack of a Carathéodory selection of the maximally monotone multifunction is overcome with the use of the Minty transform.

Bibliografia

- [1] A. Denkowska, P. Gwiazda, P. Kalita, *On renormalized solutions to elliptic inclusions with nonstandard growth*, *Calc. Var.* 60 (2021), art. 21;
<https://doi.org/10.1007/s00526-020-01893-4>.