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Maximal regularity for nonsmooth parabolic problems in Sobolev-Morrey spaces. (English)

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Parabolic equations with discontinuous coefficients are widely studied in the literature after the seminal papers by DeGiorgi-Nash and Ladyzhenskaja, Solonnikov and Uralc'eva. By using these classical results one deduces the Hölder regularity of the solutions. On the other hand, if one wants to prove the maximal regularity in the classical L^p spaces, quite surprisingly, one finds that the maximal regularity does not hold in these function spaces. There is alternative approach to the classical one based on L^p spaces, to prove regularity for elliptic and parabolic equations: it is based on the embedding properties of so called Morrey-Campanato function spaces [see *M. Giaquinta*, Multiple integrals in the calculus of variations and nonlinear elliptic systems. Ann. Math. Stud. 105. Princeton, New Jersey: Princeton University Press (1983; Zbl 0516.49003)]. In this paper the author proves that maximal regularity for parabolic equations with non smooth coefficients holds in Morrey-Campanato function spaces, by combining regularity results for solutions to non smooth equations with the original Campanato approach.

Reviewer: [Vincenzo Vespri \(Firenze\)](#)

MSC:

- 35D10 Regularity of generalized solutions of PDE (MSC2000)
- [35R05](#) PDEs with low regular coefficients and/or low regular data
- [35K20](#) Initial-boundary value problems for second-order parabolic equations
- [35B30](#) Dependence of solutions to PDEs on initial and/or boundary data and/or on parameters of PDEs

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Keywords:

[Campanato-Morrey spaces](#); [Maximal regularity](#); [nonsmooth parabolic equations](#)