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On a construction of weak solutions to non-stationary Stokes type equations by minimizing variational functionals and their regularity

Abstract: In this paper, we prove that the regularity property, in the sense of Gehring-Giaquinta-Modica, holds for weak solutions to non-stationary Stokes type equations. For the construction of solutions, Rothe's scheme is adopted by way of introducing variational functionals and of making use of their minimizers. Local estimates are carried out for time-discrete approximate solutions to achieve the higher integrability. These estimates for gradients do not depend on approximation.