

Philippe Clément¹, Stig-Olof Londen² and Gieri Simonett³ : *Quasilinear evolution equations and continuous interpolation spaces*; Helsinki University of Technology Institute of Mathematics Research Reports A445 (2002).

Abstract: *In this paper we analyze the abstract parabolic evolutionary equations*

$$D_t^\alpha(u - x) + A(u)u = f(u) + h(t), \quad u(0) = x,$$

in continuous interpolation spaces allowing a singularity as $t \searrow 0$. Here D_t^α denotes the time-derivative of order $\alpha \in (0, 2)$.

We first give a treatment of fractional derivatives in the spaces $L^p((0, T); X)$ and then consider these derivatives in spaces of continuous functions having (at most) a prescribed singularity as $t \searrow 0$. The corresponding trace spaces are characterized and the dependence on α is demonstrated. Via maximal regularity results on the linear equation

$$D_t^\alpha(u - x) + Au = f, \quad u(0) = x,$$

we arrive at results on existence, uniqueness and continuation on the quasilinear equation. Finally, an example is presented.

AMS subject classifications: 35K90, 35C90

Keywords: Abstract Parabolic Equations, Continuous Interpolation Spaces, Quasilinear Evolutionary Equations, Maximal Regularity

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Helsinki University of Technology

Department of Engineering Physics and Mathematics

Institute of Mathematics

P.O. Box 1100, 02015 HUT, Finland

email:math@hut.fi <http://www.math.hut.fi/>

¹Department of Mathematics and Informatics
TU Delft

2600 GA Delft, The Netherlands

²Helsinki University of Technology

Stig-Olof.Londen@hut.fi

³Department of Mathematics

Vanderbilt University

Nashville TN 37240, USA