

# SEMILINEAR PARABOLIC EQUATIONS WITH UNBOUNDED COEFFICIENTS IN THE LINEAR PART

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ABSTRACT. We study first local existence and uniqueness of mild solution to the following semilinear parabolic Cauchy problem

$$\begin{cases} D_t u(t, x) = Au(t, x) + f(t, u(t, x)), & t > 0, x \in \mathbb{R}^d, \\ u(0, x) = u_0(x), & x \in \mathbb{R}^d, \end{cases} \quad (1)$$

where  $A$  is the elliptic operator

$$A = \sum_{i,j=1}^d q_{ij}(x)D_{ij} + \sum_{j=1}^d b_j(x)D_j$$

with possibly unbounded coefficients  $q_{ij}$  and  $b_j$ .

Regularity of mild solutions and global existence of classical solutions to the problem (1) will be investigated. We end by studying the stability of the null solution.

We refer to the recent paper [1] where one can deduce the autonomous case from the nonautonomous one and to [2] for the more general theory.

## REFERENCES

- [1] L. Angiuli and A. Lunardi *Semilinear nonautonomous parabolic equations with unbounded coefficients in the linear part*, *Nonlinear Analysis* **125** (2015), 468-497.
- [2] A. Lunardi *Analytic Semigroups and Optimal Regularity in Parabolic Problems*, *Progress in Nonlinear Differential Equations and Their Applications*, **16**, Birkhäuser Verlag, Basel (1995).

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