

## SOME GENERAL EXISTENCE PRINCIPLES FOR ORDINARY DIFFERENTIAL EQUATIONS

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(Submitted by A. Granas)

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*Dedicated to the memory of Juliusz Schauder*

### 1. Introduction

In this paper some general existence principles for the first order initial value problem

$$(1.1) \quad \begin{cases} y' = f(t, y), & 0 < t < T, \\ y(0) = a \end{cases}$$

and the second order boundary value problem

$$(1.2) \quad \begin{cases} (py')' = f(t, y, py'), & 0 < t < 1, \\ -\alpha y(0) + \beta \lim_{t \rightarrow 0^+} p(t)y'(t) = c & \alpha \geq 0, \beta \geq 0, \\ \alpha y(1) + b \lim_{t \rightarrow 1^-} p(t)y'(t) = d & a \geq 0, b \geq 0 \text{ and } \alpha + a > 0 \end{cases}$$

are established. The literature on problems of the above form is extensive, see [1, 3–6, 8–9, 11–13] and their references. In all of these papers  $f$  is assumed to be continuous or a Carathéodory function. However, in many applications this class