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Discontinuous solutions of semilinear differential-algebraic equations. II: \mathcal{P} -consistency.
(English) [Zbl 0863.34001](#)

Nonlinear Anal., Theory Methods Appl. 27, No. 11, 1257-1280 (1996).

Continuing their research in [Nonl. Anal., Theory Methods Appl. 27, 1241-1256 (1996)] the authors suggest a way of selecting certain \mathcal{P} (perturbation)-consistent distribution solutions of implicit differential equations of the form: (1) $A(t).x' = G(t, x)$ where $A(t)$, $t \in J \subset \mathbb{R}$ are singular $n \times n$ matrices of constant rank $r < n$. More precisely, assuming that equation (1) is a limit-case of the (perturbed) \mathcal{P}_μ equation (2) $\bar{A}(\mu, t).x' = \bar{G}(\mu, t, x)$ in the sense that $A(t) = \bar{A}(0, t)$, $G(t, x) = \bar{G}(0, t, x)$, the authors introduce the concepts of \mathcal{P}_μ -consistent initial points and \mathcal{P}_μ -consistent solutions of (1) and discuss their relationships with the Tikhonov-Levinson theorem on singular perturbations of *R. E. O'Malley* [Appl. Math. Sci. 89, Springer, New York (1991; [Zbl 0743.34059](#))]. The largest part of the paper is devoted to the discussion of some examples in nonlinear circuit theory.

Reviewer: [S.Mirica \(București\)](#)

MSC:

- [34A09](#) Implicit ordinary differential equations, differential-algebraic equations
- [65L05](#) Numerical methods for initial value problems involving ordinary differential equations
- [65L20](#) Stability and convergence of numerical methods for ordinary differential equations
- [34A12](#) Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions to ordinary differential equations

Cited in **2** Documents

Keywords:

distribution solution; impass point; \mathcal{P} -consistency; Tikhonov-Levinson theorem

Full Text: [DOI](#)

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