

Schlöder, Johannes P.

Numerische Methoden zur Behandlung hochdimensionaler Aufgaben der Parameteridentifizierung. (Numerical methods for the treatment of high-dimensional parameter identification problems.). (German) Zbl 0639.65036
Bonn. Math. Schr. 187, 150 p. (1988).

Problems of parameter estimation in ordinary differential equations, where data from different experimental situations (the dynamical behaviour, stable an $y(a) = \alpha$ is equivalent to the integral equation

$$y(t) = \alpha + \int_a^t f(s, y(s)) ds, \quad t \in [a, b].$$

The author formulates and analyzes integrand-approximation formulas, each of which can be written in the form

$$(2) \quad y_\tau(t) = \alpha + \int_a^t A_\tau[f(\cdot, y_\tau(\cdot))](s) ds, \quad t \in [a, b],$$

for the numerical solutions of the initial value problem (1). $A_\tau[f(\cdot, y_\tau(\cdot))](s)$ in (2) is an approximation to $f(s, y_\tau(s))$, and the index τ is associated with the particular stepsize and order sequence used in the numerical integration. Here A_τ is a linear operator. The formulation (2) enables the author to apply many of the theorems for differential equations and the techniques of functional analysis to study the convergence of y_τ to y .

Reviewer: [N.Parhi](#)

MSC:

- [65K10](#) Numerical optimization and variational techniques
- [65L10](#) Numerical solution of boundary value problems involving ordinary differential equations
- [34A55](#) Inverse problems involving ordinary differential equations
- [34B10](#) Nonlocal and multipoint boundary value problems for ordinary differential equations
- [93B30](#) System identification

Cited in **9** Documents

Keywords:

[high-dimensional parameter identification problems](#); [parameter estimation](#); [convergence](#)