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**Effati, S.; Hoseini, M.; Nazemi, A.R.**

**A new numerical method by revised measure theory for solving the nonlinear initial value problems.**

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This paper is concerned with the numerical solution of initial value problems (IVPs) for $n$th order differential equations

$$y^{(n)} = F(t, y, y', \dots, y^{(n-1)}), \quad y^{(j)}(t_a) = y_a^{(j)}, j = 0, \dots, n-1, \ t \in [t_a, t_b]. \tag{1}$$

After transforming this equation into an equivalent first order system in the standard form $x'(t) = g(t, x(t)), x(t_a) = x_a \in \mathbb{R}^n$, $t \in [t_a, t_b](1)$, the authors start a mathematical metamorphosis of (1) with several stages. In the first stage, by introducing an artificial cost function, the IVP (1) is written as a minimization problem over a set of Radon measures. Then, in a second stage, the problem is approximated by a finite dimensional linear programming problem. It is unclear what are the advantages of this approach for solving IVPs because the original IVP (1) is transformed into a more complicated problem and some approximations are also introduced, and no results on the accuracy and stability properties of this method are given. Finally, some numerical experiments with a linear second order equation and a first order equation are presented.

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*Keywords:* initial value problems; linear programming; Radon measures; numerical experiments
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