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On solutions of $x'' = t^{\alpha\lambda-2}x^{1+\alpha}$ in the unsettled cases. (English) Zbl 1470.34100
Yokohama Math. J. 65, 77-84 (2019).

The author considers the following Emden-Fowler type differential equation

$$x'' = t^{\alpha\lambda-2}x^{1+\alpha}. \quad (1)$$

Here α and λ are real parameters, t, x - are positive variables.

The article consists of 3 sections and references. The first section is devoted to a general introduction into the problem. The second section is devoted to the asymptotic representation of solutions of the equation (1) in the cases

$$\alpha < \lambda_0, \lambda < -1 \text{ or } \alpha < \lambda_0, \lambda > 0 \quad (\lambda_0 = -(2\lambda + 1)^2/4\lambda(\lambda + 1)).$$

The third section is devoted to the asymptotic representation of solutions of the equation (1) in case

$$\alpha < 0, -1 < \lambda < 0.$$

The asymptotic formulas for the solutions of the equation (1) are obtained in the form of a series. Corresponding results were obtained in the works of *G. Sansone* [in: *Equadiff 78, Conv. int. su equazioni differenziali ordinarie ed equazioni funzionali*, Firenze 1978, Suppl. separati, 38 p. (1978; [Zbl 0429.34003](#))] and *V. M. Evtukhov* [The asymptotic behavior of solutions of a nonlinear second order differential equation of the Emden-Fowler type. Odessa: Odessa State University (Diss.) (1980)].

In my opinion the results presented in the article are very important for the further study of asymptotic representations of solutions of n-th order differential equations of the Emden-Fowler type.

Reviewer: [Olga Chepok \(Odessa\)](#)

MSC:

- [34C11](#) Growth and boundedness of solutions to ordinary differential equations
- [34D05](#) Asymptotic properties of solutions to ordinary differential equations

Keywords:

[asymptotic behaviour](#); [analytical expression](#); [initial value problem](#)

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