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## ON THE OSCILLATIONS OF THE SOLUTIONS OF THE EQUATION $y'' + a(x)y = f(x)$

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**Abstract.** It is known that the equation (2) determines non-elemental linear oscillations of the second order, which are the first generalization of ordinary harmonical oscillations. In the paper, there is firstly a resume of some our previous results which more precisely determine nature of oscillatory solutions, Sturm's theorems on locations of zeroes and extremes are given next, and finally there is discussion on oscillatoriness and general solution for arbitrary integration constants  $C_1$  and  $C_2$

Furthermore, for the non-homogeneous equation (2), the issue of oscillatoriness of the general solution is discussed. Problems of amplitudes, oscillatoriness, resonance and stability of possible solutions are approached.

A momentum and initiative is given that the same is to be done for the most general non-homogeneous linear equations, primarily of the second order, but of higher orders as well.

### 1. INTRODUCTION

Very important question of entire engineering related to the theory of oscillations is the question of oscillations and zeroes of solution of the equation.

$$y'' + a(x)y = f(x) \tag{1}$$



















