The method of accelerated convergence for constructing conditional-periodical solutions

Zhussip SULEIMENOV [1]

[1] *Al-Farabi Kazakh National University, Kazakhstan*
E-mail: zh_suleimenov@mail.ru

Abstract: In the present paper we take quasi-linear system of differential equations

$$\frac{dx}{dt} = Ax + \varepsilon f(t,x), \tag{1}$$

where $x = colon(x_1, x_2)$, $A = (a_{jk}), j = k = 1, 2$,
$f(t,x) = colon(f_1(t, x_1, x_2), f_2(t, x_1, x_2))$
conditionally-periodic by t with frequency basis $\omega_1, \omega_2, ..., \omega_n$; analytical by t and x in the domain
$D = \left\{(t,x) \subset C^3 : ||x|| \leq h, ||Im\omega t|| \leq q\right\}$ function, $det|A - \lambda E| = 0$ has purely imaginary roots $i\sigma_1, i\sigma_2$, and rational numbers σ_1, σ_2 non-co-measurable with $\omega_1, \omega_2, ..., \omega_n$, ϵ is a small parameter.

In order to find a conditionally-periodic solutions of (1) the method of accelerated convergence [1] is applied. As an initial approximate conditionally-periodic solutions of the system (1) $x^{(0)}(t,\varepsilon) = 0 := colon(0,0)$ is chosen. Its residual denoted by $x^{(1)}(t,\varepsilon)$ and take this function as a first approximation to the original conditionally-periodic solutions of the system (1).

Keywords: quasi-linear system of differential equations, conditionally-periodic solution, small parameter

2010 Mathematics Subject Classification: 34B15

References

[1] Bogolyubov N., Mitropolsky Y., Samoilenko A. *The method of accelerated convergence in nonlinear mechanics.* Kiev, "Naukova Dumka", 1969.