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CHANGE OF NUMBER OF PERIOD ANNULI IN LIENARD TYPE EQUATIONS

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We consider Lienard type equation

$$x'' + \frac{2x}{1-x^2}x'^2 + g(x) = 0, \tag{1}$$

where $g(x) = -x(x+a)(x^2-c^2)(x-b)$, parameters a, b, c are positive and $a > c$ and $b > c$. $G(x)$ is a primitive of $g(x)$.

We are looking for so called period annuli.

THEOREM 1. *Let M_1 and M_2 be non-neighboring points of maximum of the function $G(x)$. Suppose that any other local maximum of $G(x)$ in the interval (M_1, M_2) is strictly less than $min\{G(M_1); G(M_2)\}$. Then there exist at least one nontrivial period annulus.*

We use transformation by Sabatini [1] which allows the reduction of equation (1) to a conservative one of the form

$$u'' + h(u) = 0. \tag{2}$$

We consider also the respective primitive function $H(u) = \int_0^u h(s)\, ds$.

The existence of period annulus is dependent on the system

$$H(a) > 0 \quad and \quad H(b) > 0. \tag{3}$$

REFERENCES

[1] M. Sabatini. On the period function of $x'' + f(x)x'^2 + g(x) = 0$. *J. Diff. Equations*, **196** , 2004, 151 – 168.