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Twist solutions of a Hill's equation with singular term. (English) Zbl 1016.34044
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The author deals with 2π -periodic twist solutions to the Brillouin equation

$$x''(t) + w(t)x(t) = \frac{1}{x(t)},$$

where w is a continuous 2π -periodic function with an average value $\gamma > 0$ over the period. The average value γ and the number $\alpha = \gamma^{-1} \max w(t) - 1$ are considered as parameters of the problem. In the main theorem, the author determines a region of the parameters γ and such that a twist 2π -periodic solution exists. As a consequence of the twist theorem of Moser, a twist solution is Lyapunov stable and in its neighborhood there exist quasiperiodic solutions and infinitely many subharmonic solutions with minimal period going to infinity. The method of the proof of the main result includes the tools of upper and lower solutions, topological degree and Birkhoff normal forms of area preserving maps.

Reviewer: [Dmitrii Rachinskii](#)

MSC:

[34C25](#) Periodic solutions to ordinary differential equations

Cited in **18** Documents

Keywords:

[twist solution](#); [Brillouin equation](#); [upper and lower solutions](#); [Lyapunov stability](#)

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