On an elementary method for the study of stability of Meissner's equation

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We investigate the equation

$$x'' + a^2(t)x = 0,$$

which can be write into the form

$$x'' + \lambda^2 Q(t)x = 0,$$

where

$$Q(t) := \begin{cases} \dfrac{g}{l-\varepsilon} & \text{if } k2\pi \le t < (2k+1)\pi, \\ \dfrac{g}{l+\varepsilon} & \text{if } (2k+1)\pi \le t < (k+1)2\pi, \end{cases} \qquad (k \in \mathbb{Z});$$

is a 2π-periodic, non-negative valued step-function, $\lambda \in \mathbb{R}$. We try to give a stability map on $(\lambda - \varepsilon)$-space using only elementary analysis and avoid Floquet theory.

This is a joint work with László Hatvani from the University of Szeged.

[1] L. Csizmadia, L. Hatvani, An extension of the Levi–Weckesser method to the stabilization of the inverted pendulum under gravity, *Meccanica* **49** (2014), 1091–1100.

[2] L. Hatvani, An elementary method for the study of Meissner's equation and its application to proving the Oscillation Theorem, *Acta Sci. Math.* **79** (2013), 87–105.