The stability properties of Hill's linear periodic ODE for large parameters

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The goal is to study the parameter plane in the large for Hill-like equations, that is, of the form $\ddot{x} + (a + bp(t))x = 0$, p being 1-periodic (or 2π-periodic) with zero average.

Asymptotic estimates of the density of the stability regions in the (a, b)-plane for lines of the form $a = \omega^2 \cos(\psi), b = \omega^2 \sin(\psi)$ when $\omega \to \infty$ are provided.

This density changes in a discontinuous way at some critical values of ψ and the fine structure across these critical directions is investigated.

Furthermore an explanation is given for the web-like structure of the exponentially narrow stability channels, for large a, b, together with asymptotic estimates of the lines forming that web.

The talk is partly based on ongoing work with H. Broer and M. Levi.