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On generalised canonical axial waveguides

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The dynamic behaviour of the class of periodic phononic waveguides whose unit cells are generated through a quasicrystalline sequence can be interpreted geometrically in terms of a trace map that embodies the recursive rule obeyed by traces of the transmission matrices. It has been recently shown [1,2] that for a *canonical* waveguide, the orbits predicted by the trace map at specific frequencies, called *canonical frequencies*, are periodic onto a surface in a 3D space associated with the invariant of the problem. In this talk, we extend the concept of canonical phononic axial waveguide to generalised Fibonacci sequences and show specific behaviours of the canonical configurations for the so-called *silver*-mean sequence. We explore various kind of periodic orbits for the trace map associated with different self-similar properties of the stop/pass band layout. The obtained results represent both a key to a better understanding of the dynamic properties of classical two-phase composite waveguides and an important advancement towards the realisation of composite quasicrystalline metamaterials.

References

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