

CLASSICAL SOLUTIONS OF OBSERVATION PROBLEMS RELATED TO VIBRATING STRINGS

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We investigate observation problems related to string vibrations using classical tools. That is, we find the initial state of a string provided we have partial information about the movement (position or speed) of the string at two time instants. In the case of the finite string we consider the homogeneous equation with a general boundary condition and we use Fourier expansions to reconstruct the initial data. The main restrictions are some Diophantine conditions and asymptotic properties of the eigenfrequencies ω_n as $n \rightarrow \infty$. In the case of the infinite string, we consider the inhomogeneous equation and we use D'Alembert's formula and Duhamel's principle to find how it was started. However, this time the solution is not unique.

- [1] A. SZIJÁRTÓ, J. HEGEDŰS, Observability of string vibrations, *Electron. J. Qual. Theory Differ. Equ.* **77** (2013), 1–16.