Currie, Sonja; **Roth, Thomas T.**; **Watson, Bruce A.**

Inverse problems for first-order differential systems with periodic 2×2 matrix potentials and quasi-periodic boundary conditions. (English) Zbl 1410.34262

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This short article is concerned with the first order system

$$JY' + QY = \lambda Y$$

on the interval $[0, \pi]$, where

$$J = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}, \qquad Q = \begin{pmatrix} q_1 & q \\ q & q_2 \end{pmatrix},$$

and q, q_1, q_2 are real-valued and integrable functions on $(0, \pi)$. For some fixed $\theta \in [0, \pi]$, the coupled boundary conditions

$$Y(\pi) = \pm R(\theta) Y(0)$$

are imposed, where $R(\theta)$ is the matrix given by

$$R(\theta) = \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix}.$$

It is shown that all eigenvalues of the corresponding two boundary value problems are double if and only if $q_1 = q_2$ and $q = 0$.

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MSC:

34L40 Particular ordinary differential operators (Dirac, one-dimensional Schrödinger, etc.)
34B05 Linear boundary value problems for ordinary differential equations
34A55 Inverse problems involving ordinary differential equations

Keywords:

Dirac system; quasi-periodic boundary conditions; inverse problem

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