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MIXED PROBLEM FOR KLEIN-GORDON-FOCK-EQUATION WITH CURVE DERIVATIVES ON BOUNDS

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Let's consider the problem in area $Q = \{(t,x) | t \in [0;\infty), x \in [0,l]\}$

$$\partial_{tt}u - a^2\partial_{xx}u - \lambda(t,x)u = f(t,x), \tag{1}$$

with initial

$$u(0,x) = \varphi(x),\ u_t(0,x) = \psi'(x), x \in [0,l] \tag{2}$$

and boundary conditions

$$r_1^{(i)}(t)u_t(t,0) + r_2^{(i)}(t)u_x(t,0) + r_3^{(i)}(t)u(t,0) = \mu^{(i)}(t), t \in [0,\infty), i \in \{0,l\}. \tag{3}$$

Theorem 1. Assuming that functions $\mu^{(i)} \in C^{(2)}([0;\infty))$, $\varphi \in C^{(3)}([0,l])$, $\psi \in C^{(2)}([0,l])$, $\lambda \in C^{(1,1)}(Q)$ then solution of problem (1) – (3) will exists and be unique in class $C^{(2)}(Q)$ if and only if homogeneous matching conditions are met.

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