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<td>波動方程式およびウィルゼルの境界条件とその関連セミグループ (エルゴード理論とその周辺)</td>
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<td>UENO, TADASHI</td>
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Wave Equation with Wentzell's Boundary Condition
and a Related Semigroup on the Boundary

By Tadashi Ueno

The College of General Education, University of Tokyo

Here, the problem is to solve the wave equation

\[
\frac{\partial^2 u}{\partial t^2}(x) = Au(x), \quad x \in \Omega
\]

on a compact domain \( \Omega \), with Wentzell's boundary condition

\[
Lu(x) = \sum_{i=1}^{N-1} a_{ij}(x) \frac{\partial^2 u}{\partial x_i \partial y_j}(x) + \sum_{i=1}^{N-1} \beta_i(x) \frac{\partial u}{\partial y_i}(x) + \gamma(x) + \delta(x)Au(x)
\]

\[
+ \int_{\partial \Omega} (u(y) - u(x) - \sum_{i=1}^{N-1} \frac{\partial u}{\partial y_i}(x) \xi_i(x, y)) \nu(x, dy) = 0, \quad x \in \partial \Omega,
\]

which is, in a sense, the most general boundary condition for diffusion equation. The solution is given as a group of operators on a function space.

Another group of operators is obtained, which corresponds to

\[
\frac{\partial^2 \varphi}{\partial t^2}(x) = \overline{LH} \varphi(x), \quad x \in \partial \Omega,
\]

where \( \overline{LH} \) is a closure of \( LH : (LH) \varphi(x) = L(H \varphi)(x) \). Here, \( H \varphi(x) \) is the solution of the Dirichlet problem \( Au(x) = 0, \quad x \in \Omega \), with the boundary condition \( u(x) = \varphi(x), \quad x \in \partial \Omega \).

Equation (3) is expected to describe the wave propagation through the boundary with mass distribution \( \xi(x)dx \) and the vibration term

\[
\sum_{i=1}^{N-1} a_{ij}(x) \frac{\partial^2}{\partial x_i \partial y_j}(x)
\]

of the boundary.

The concrete results are contained in the article with the same title in Proc. Japan Acad., vol. 49, 1973.