Perspectives

In forthcoming works, the results obtained in this thesis will be extended at least in the following directions:

Chapter 3:

1. The non-regular domain Q may be replaced by a non-cylindrical domain (conical domain, for example).

2. The function f on the right-hand side of the equation of Problem (3.1.1), may be taken in $L^p(Q)$, where $p \in]1, \infty[$. The method used there does not seem to be appropriate for the space $L^p(Q)$ when $p \neq 2$.

3. The heat operator L may be replaced by a high order operator.

Chapter 4:

1. The function f on the right-hand side of the equation of Problem (4.1.3), may be taken in $L^p(Q)$, where $p \in]1, \infty[$ or in Hölder spaces.

2. The unidimensional case in x, can be naturally extended to an upper dimension in x, such as, for example, the following problem

$$\partial_t u(t, x_1, x_2) - \partial_{x_1}^2 u(t, x_1, x_2) - \partial_{x_2}^2 u(t, x_1, x_2) = f(t, x_1, x_2)$$

in the domain

$$\left\{(t, x_1, x_2) \in \mathbb{R}^3 : 0 < t < 1, x_1, x_2 > 0 \text{ and } (x_1/t^\alpha, x_2/t^\alpha) \in G\right\},$$

where G is some given cylindrical domain in $\mathbb{R}^2_+$.

3. The Robin type boundary conditions may be replaced by Neumann type boundary conditions.

Chapter 5:

1. The function f on the right-hand side of the equation of Problem (5.1.1), may be chosen more regular, e. g. $f \in H^{1,2}(G)$ or $f \in H^{1}(G)$, etc.

2. The operator L may be replaced by some other operators with variable coefficients.

3. We can change the boundary conditions.