We want to consider linear partial differential equations of parabolic type in this project. Our aim is to prove existence and uniqueness of solutions of these equations in Hölder space with variable exponent. Linear parabolic equations are fundamental partial differential equations. Partial differential equation is equation with unknown function of several variables. These variables can be different. They can be place in area or time and many other parameters. We call these equations partial differential because partial derivatives appear in them.

Partial differential equations are very important in mathematics, since they were formulated in eighteenth century by D'Alambert. Many mathematicians study them. There were done huge amount of discoveries in this part of mathematics. A lot of these discoveries are used in physcis and engineering sciences or social sciences like economy and sociology because partial differential equations describe many phenomenons in the world.

As it was mentioned, special role in partial differential equations plays parabolic equations. They are also very important from physical point of view and engineering. They describe many phenomenons. Let us list few of them: dependence on time of density, temperature and electric flow. We are going to study linear parabolic equations in Hölder space with variable exponent. They have been already studied in space with constant exponent and in other function spaces, but there are not any results in spaces with variable exponent.

Hölder spaces are one of many function spaces that appear in mathematics. In simple way we can say that function spaces are sets of functions that satisfy some conditions. Spaces with variable exponent appeared, when scientists started to research image processing. It was also shown that they are useful in modeling electrorheological fluid. The viscosity of these fluids changes in response to electric field.

The concrete example of use of linear parabolic equations with variable exponent could be diffusion of substance with flicks of electrical conduction in other. Present mathematical knowledge does not give any tools to describe this phenomenon and to predict it. Now, we see that our researches would impact on development of pure mathematical knowledge, but also in other parts of science, that are used in many fields e. g. in industry.