This thesis is focused on the fixed interval scheduling (FIS) problems with random delays.

Firstly, we introduce the concept of FIS problems and the exogenous and endogenous uncertainty. In the next chapter we will summarize the FIS problems under decision dependent randomness and their relation to the robust coloring. We will extend previous results with proposing a new FIS problem with maintenance. This problem is a specific case of a decision-dependent probabilities as it allows to use a specific type of a job - the maintenance, which positively impacts the probability distributions of job delays. We start with defining a problem, where maintenance must be assigned only before regular jobs and then we propose the general case, when maintenances appears during the whole processing period. We show why this approach leads to an optimal solution and provide a detailed example of a small problem.We also discuss some extensions of our problem.

Finally, we conduct a numerical study. We solve the FIS maintenance problem with the *Cplex* solver for a few different settings of inputs. It seems that the maintenance is useful only for certain settings, such as jobs with high probability of having a delay or the price of outsourcing being much higher than the cost of maintenance. It is also shown that the problem quickly becomes too computationally demanding and it works well only for relatively small settings.