Abstract

Within the airline industry's complex operational environment, any disturbance to normal operations has dramatic impact, and usually imposes high additional costs. When disruptions occur, crew schedules are affected due to the resulting infeasible flight schedule and improper assignments. Therefore, airlines need to recover disrupted crew schedules as soon as possible, and minimize the extra cost as well as the impact on subsequent operations. The task of the airline crew recovery is to obtain one or more reasonable, perfectly optimal, recovery solutions from current disruptions, which has to be achieved within an acceptable period of time. The final solutions are optimized in terms of the amount of additional operational costs and variations from the original planned schedule. In this thesis, we develop a decision support system that incorporates exact optimization methods and several dedicated heuristics to solve real-life airline crew recovery problems in the setting of European airlines. The proposed solution methods are customized with a dedicated setting of parameters, which forms a set of strategies to deal with different disrupted situations. Furthermore, a so called strategy mapping procedure is developed to assist airline coordinators in recovering crew schedules more effectively by investigating the given disruption and proposing a suitable strategy with a proper solution method.