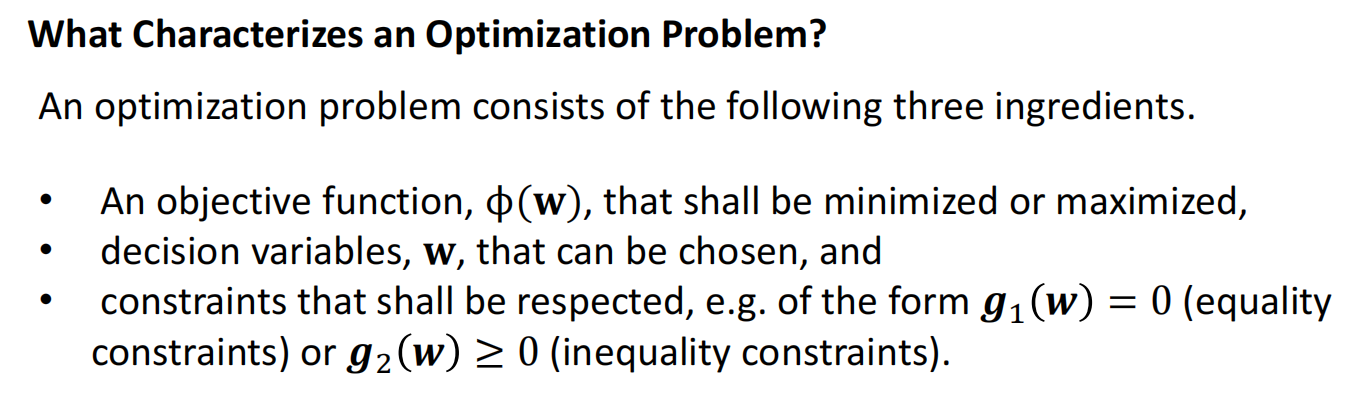
At the beginning:

Some of the materials below is based on the Mohamed W. Mehrez’s Slides, you can find them by the following link:

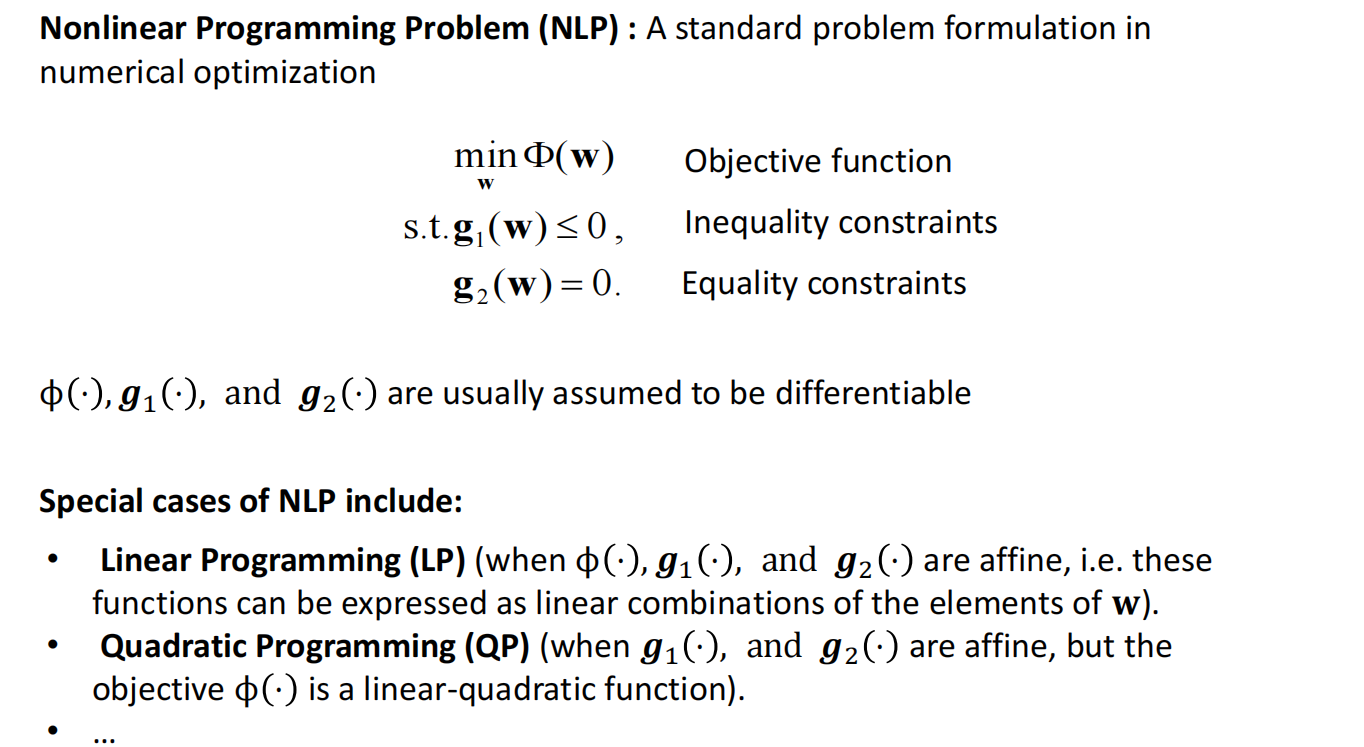
‘https://github.com/MMehrez/MPC-and-MHE-implementation-in-MATLAB-using-Casadi’

Report\_Part:

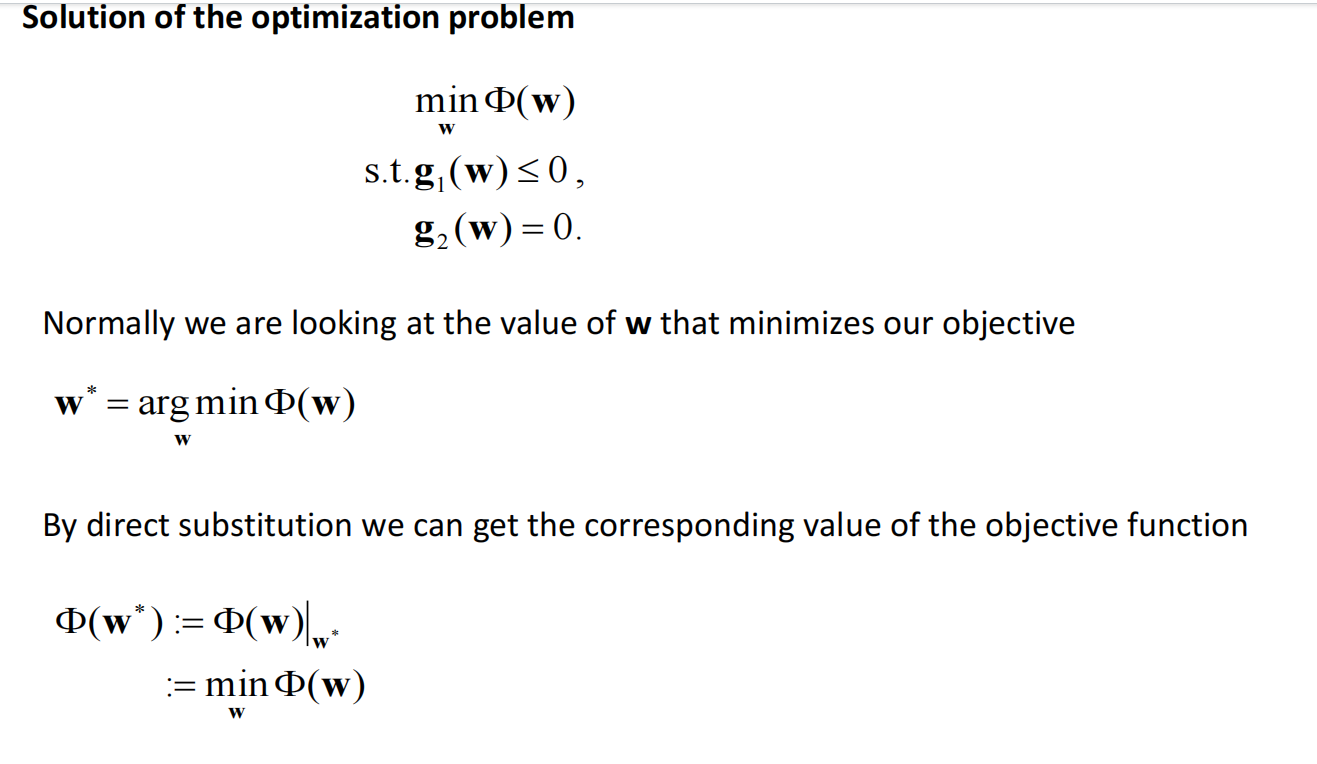
1. What Characterizes an Optimization Problem?



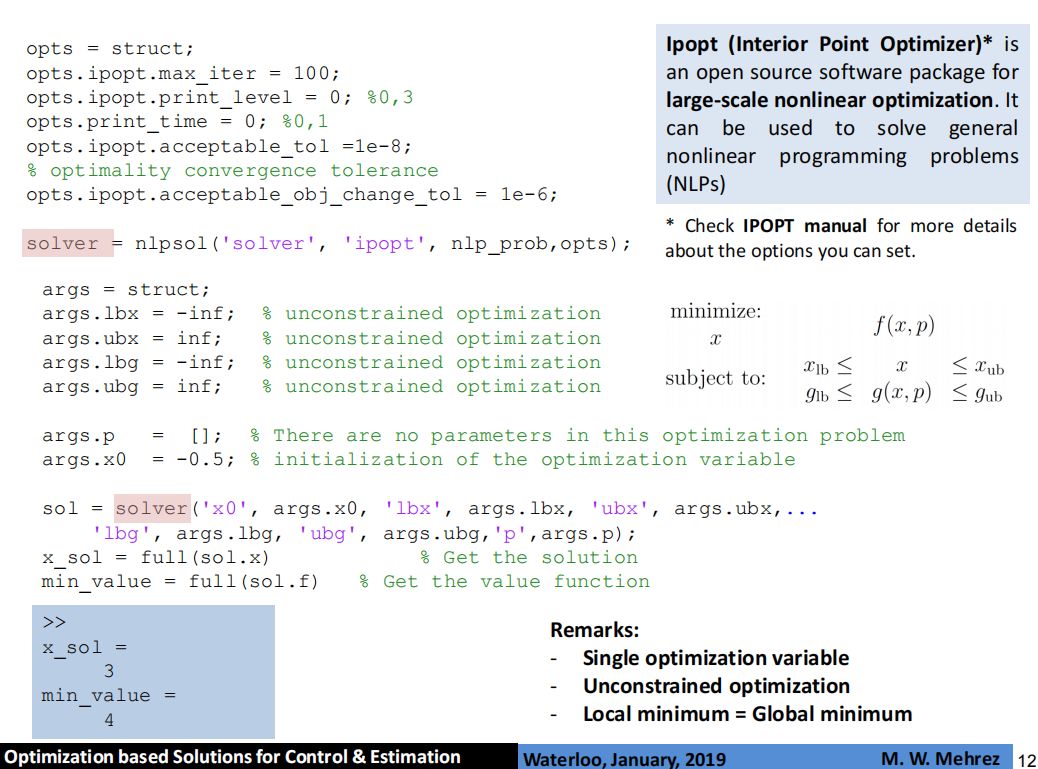
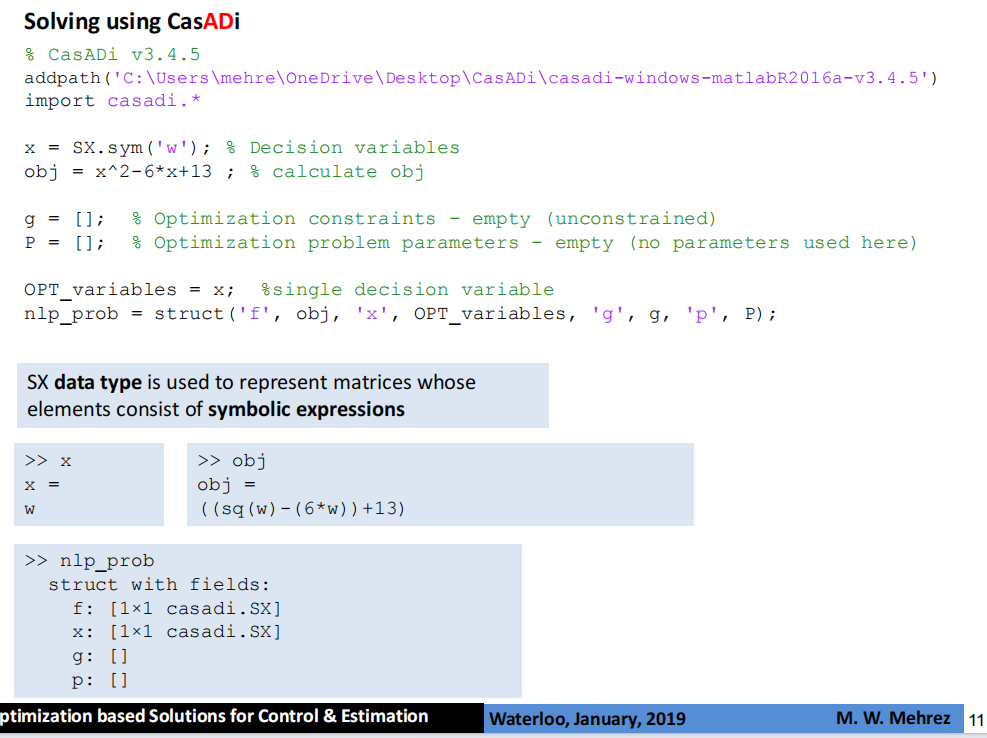
1. NLP(Nonlinear Programming Program)



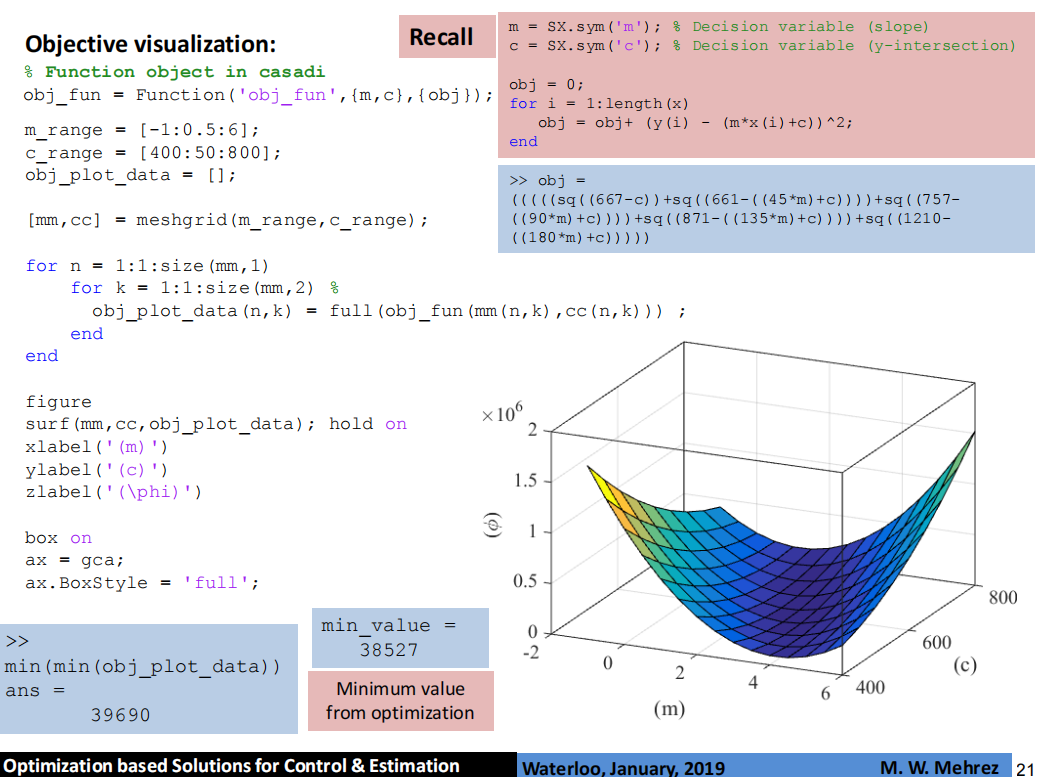
1. Solution of optimization problem



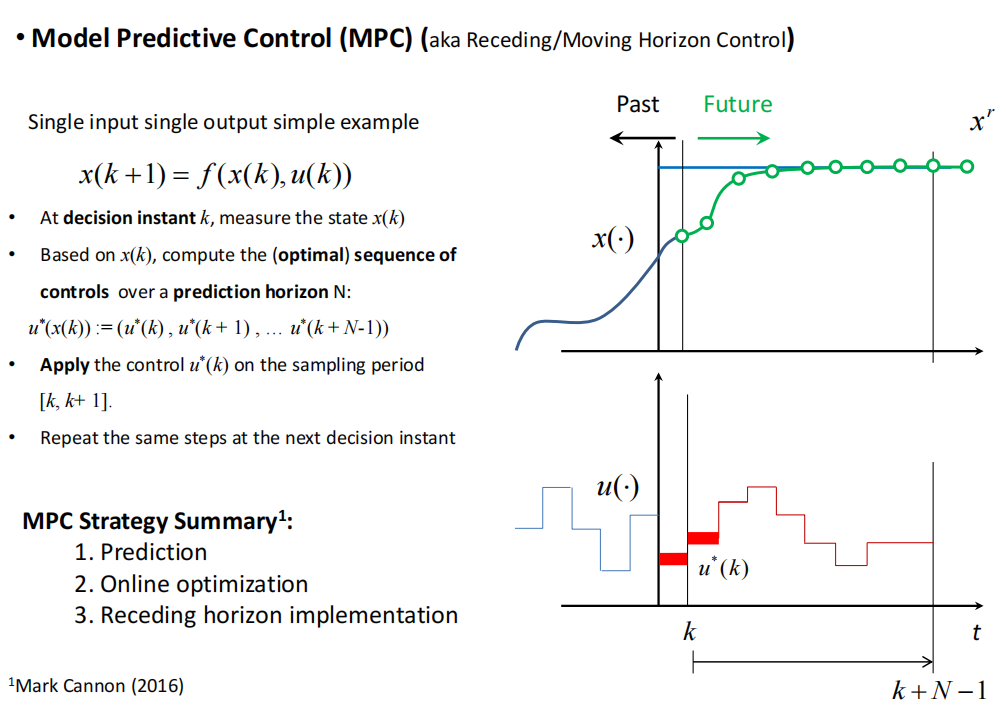
1. Code example of using CasADi



Another example:

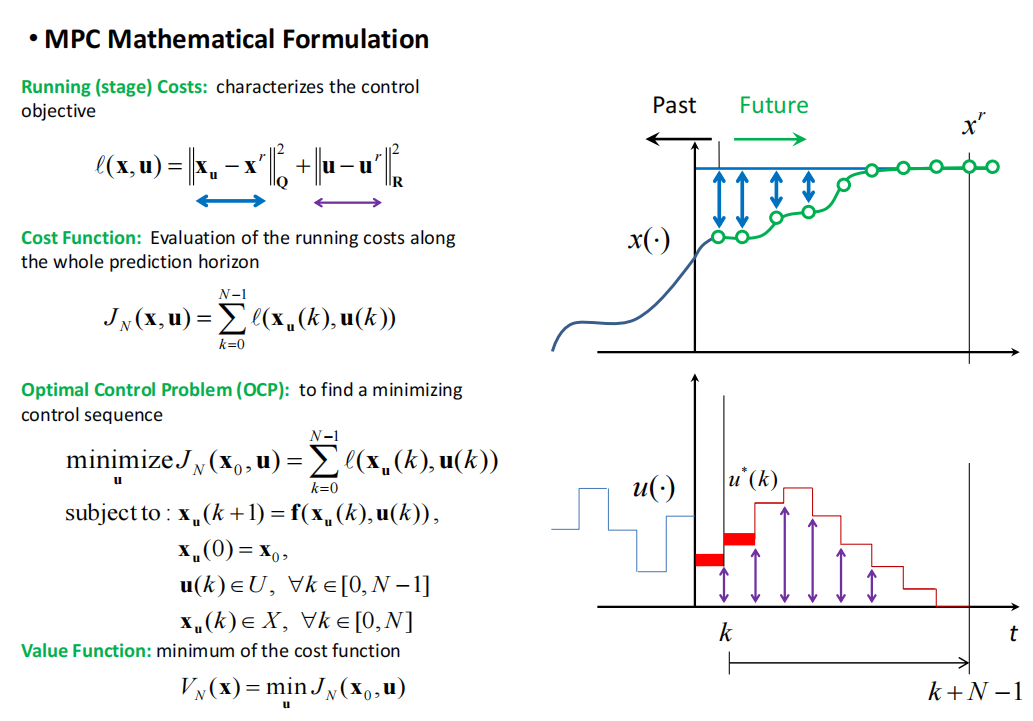


1. MPC(Model Predictive Control)

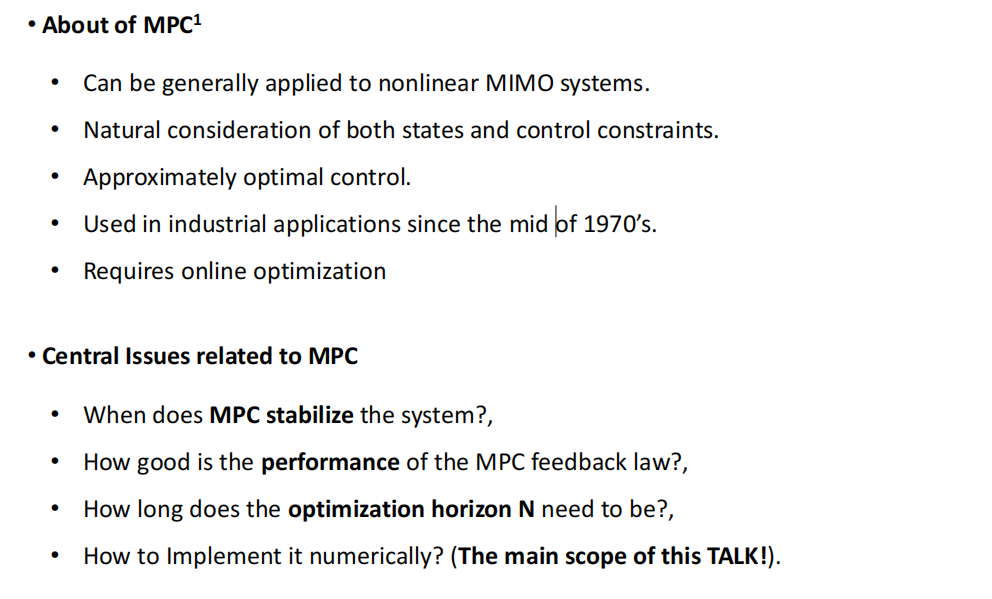


•Optimal Control Problem (OCP): to find a minimizing control sequence: to find a minimizing

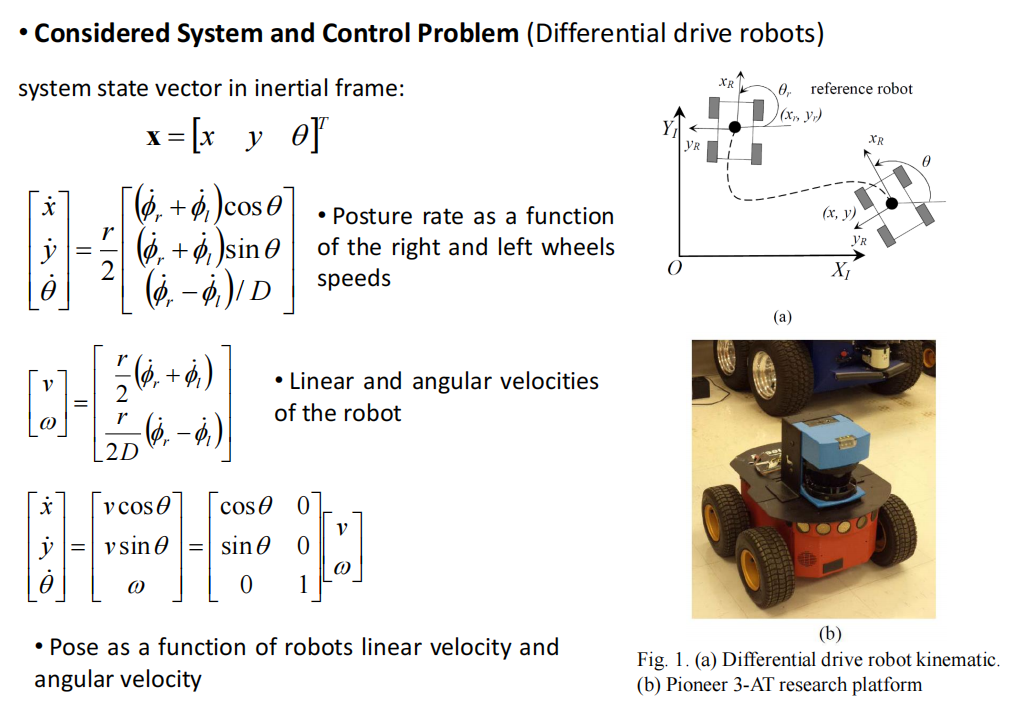
control sequence



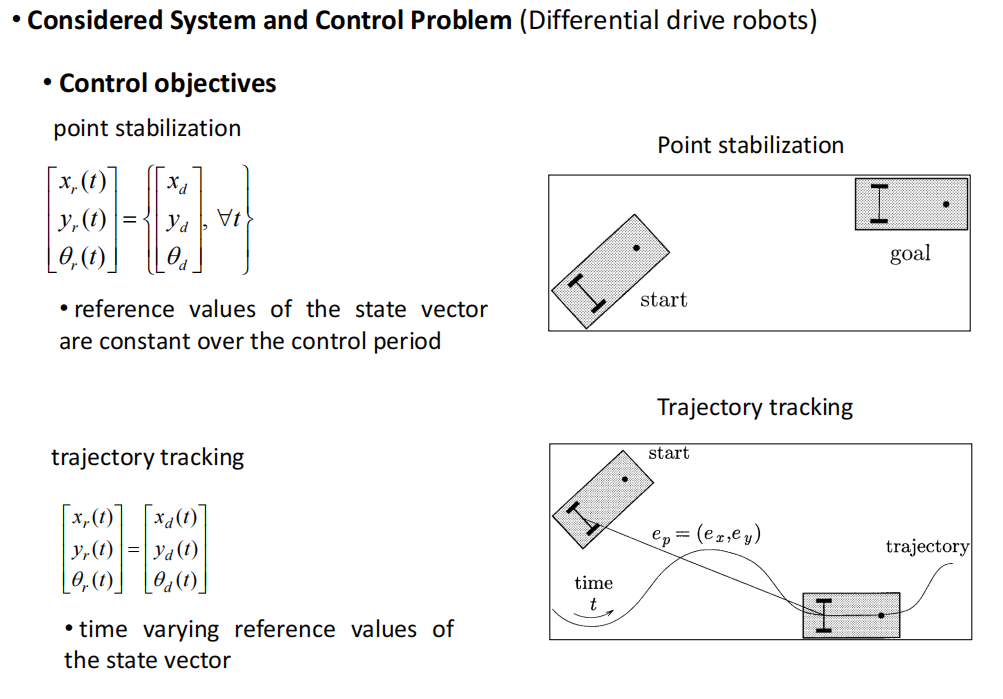
A question? : What is the principle of controlling machine/robots using AI/GPT? Is that another kind of MPC?



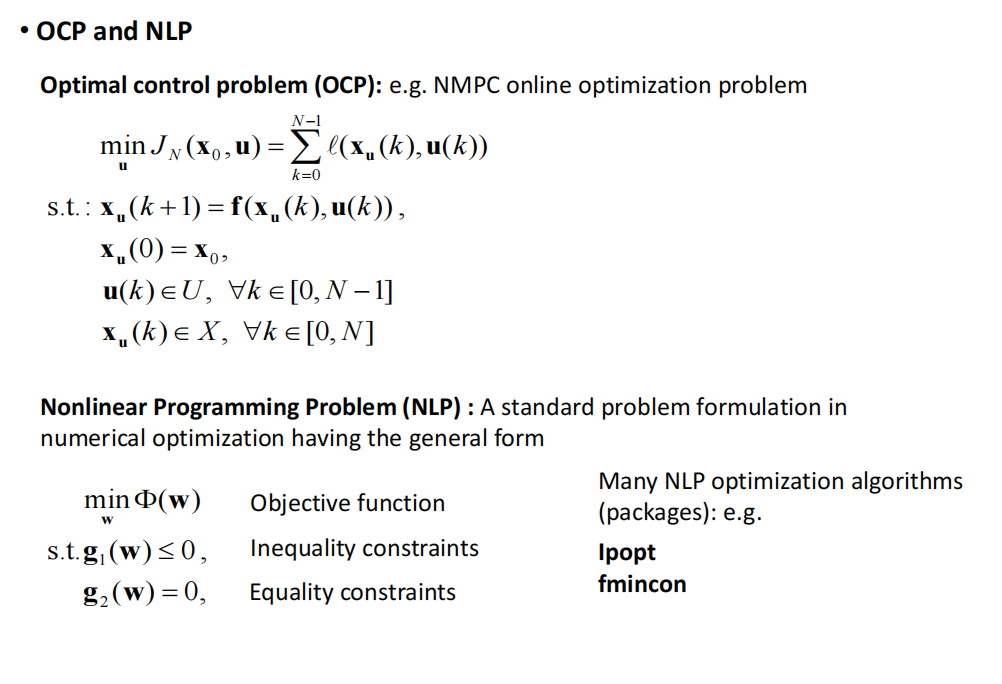
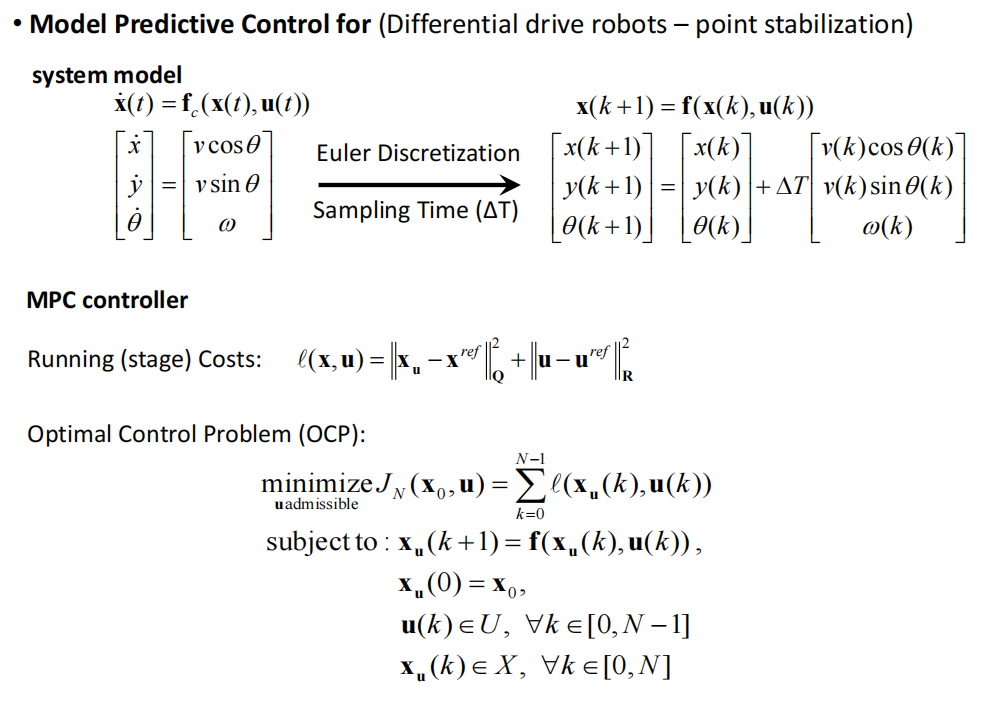
•MPC Implementation to Mobile Robots control:



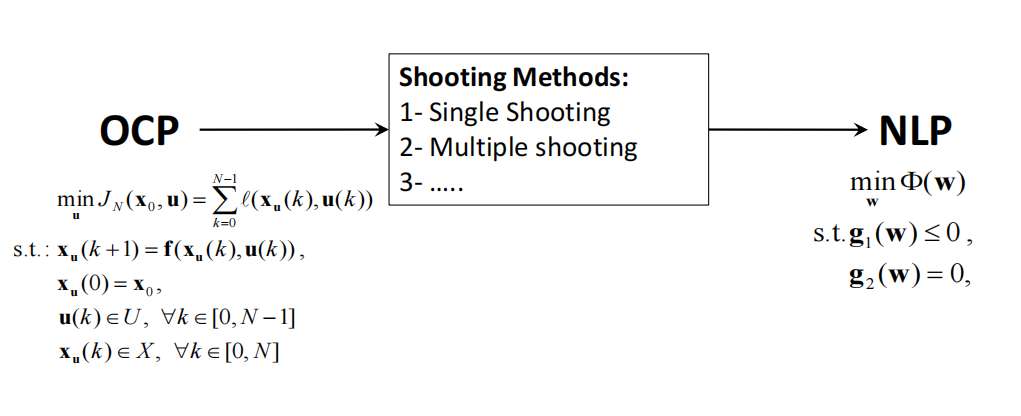
Considered System and Control Problem (Differential drive robots)



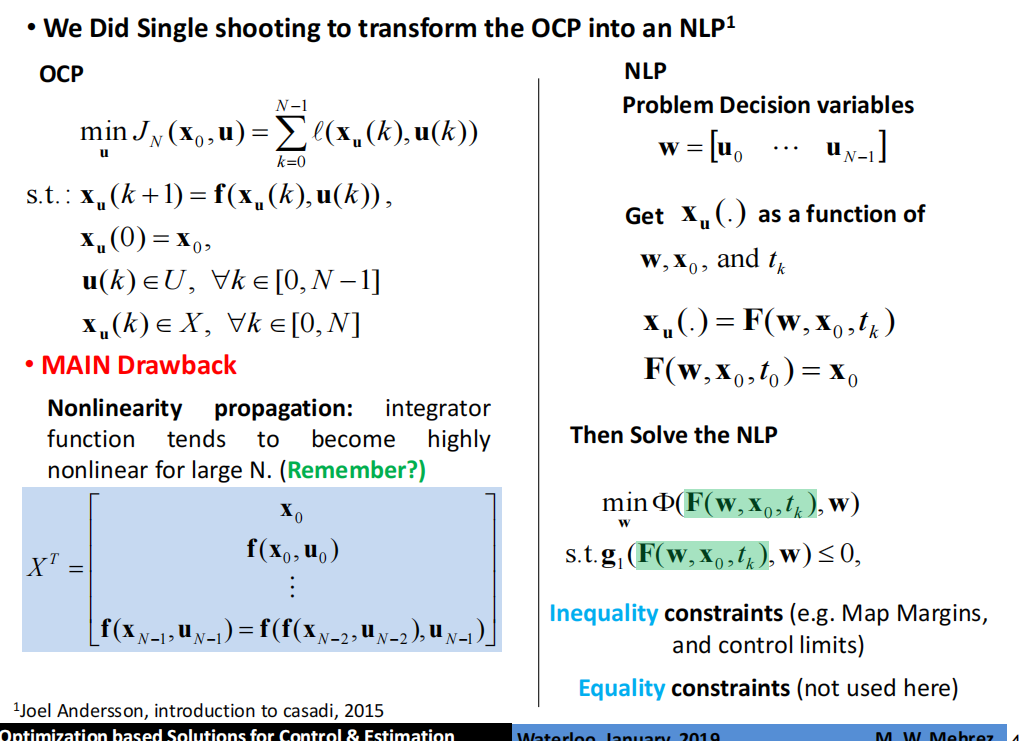
Model:



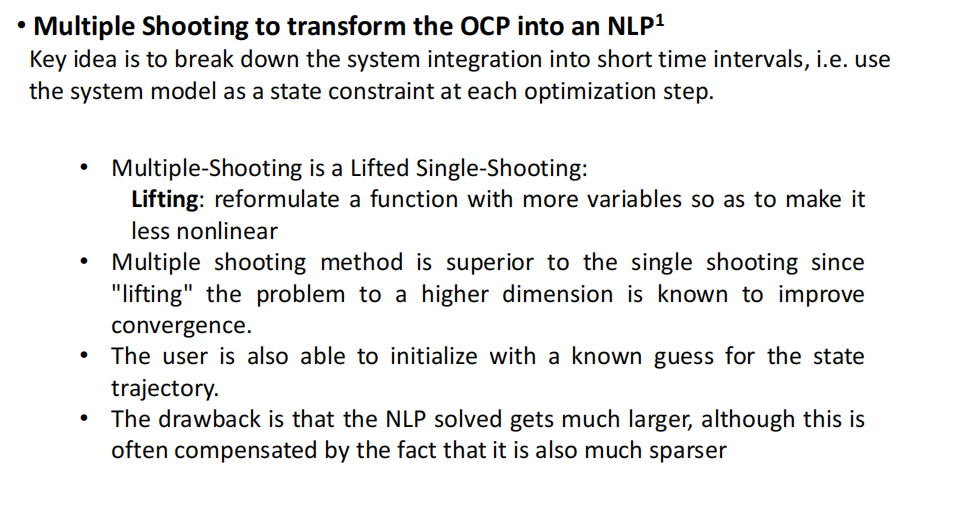
• OCP(Optimal Control Problem) and NLP(Nonlinear Programming Problem)

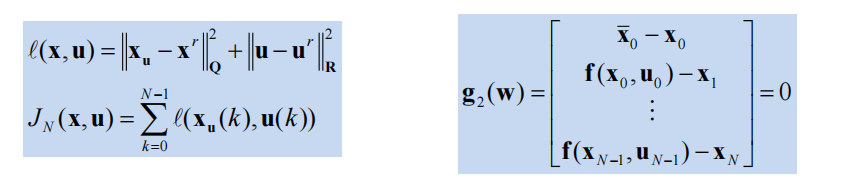


1. Single shooting to transform the OCP into an NLP1(Sim\_1\_MPC\_Robot\_PS\_sing\_shooting.m)



1. Multi shooting to transform the OCP into an NLP1(Sim\_2\_MPC\_Robot\_PS\_mul\_shooting.m)





1. Concluding remarks about MPC and MHE(Actually not consider here)

