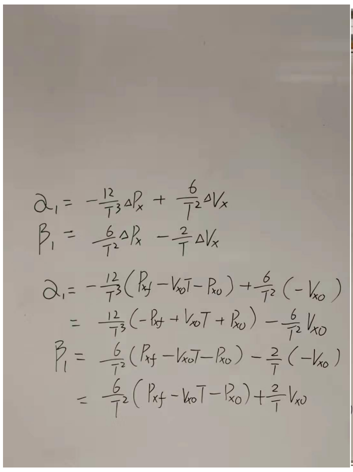
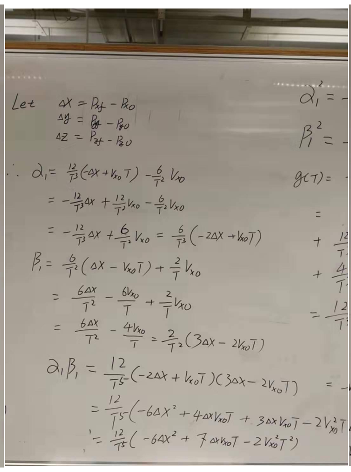
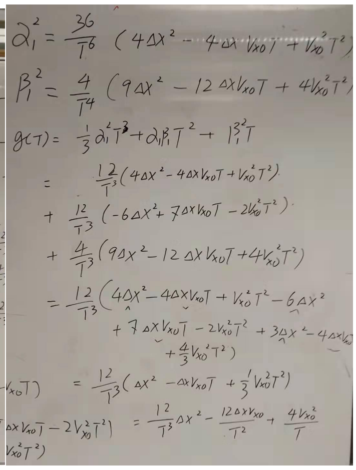
Problem formation

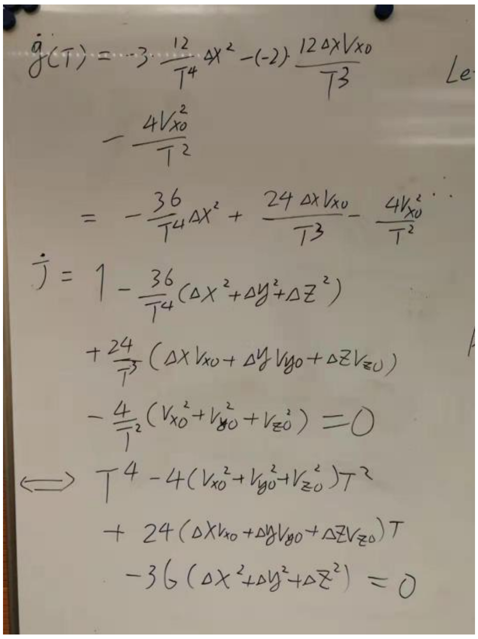
The process to get the optimal J as a function a function of T, is shown as follow:
Remark: the final speed is assumed to be zero.



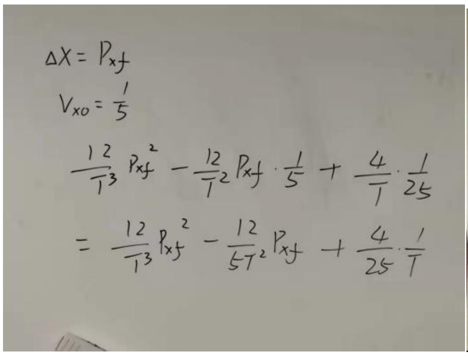


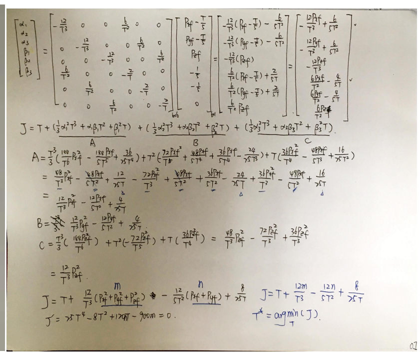


Final equation (Note that T is bigger than zero):



Validation: Ref: https://blog.csdn.net/fb_941219/article/details/102984587
It proofs that the equation is correct.

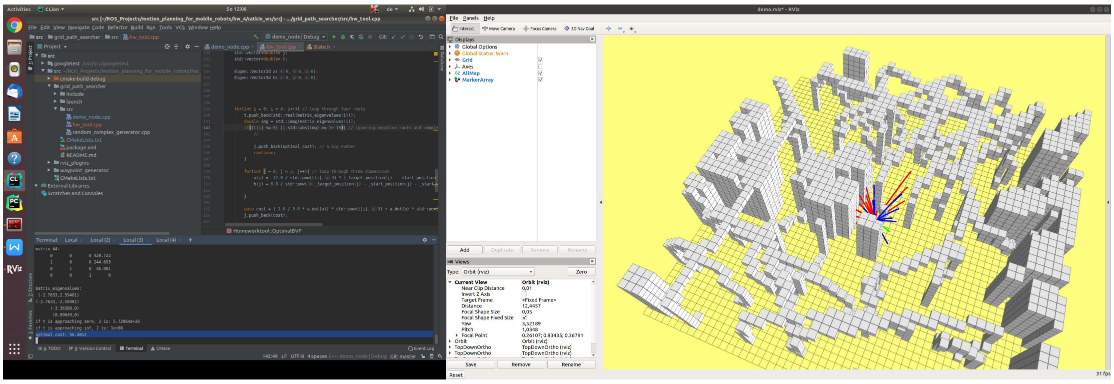




Analytic Solution to the quadratic equation

A comparison matrix is used, based on:
https://blog.csdn.net/fb_941219/article/details/102984587

Programming and Simulation



Suggestions

It would be better to have more descriptions for the assignment. The instruction is rather unclear. It took me a lot of time to understand why the code combines forward integration with BVP.

Future work

It will be interesting to get the optima of J using convex optimization.