|  |  |  |  |
| --- | --- | --- | --- |
| 50 swing-ups | IPOPT | SNOPT low tolerance | SNOPT high tolerance |
| Result1 | 1.3495e3 | 1.3975e3 | 1.3496e3 |
| Result2 | 1.3496e3 | 1.3971e3 | 1.3496e3 |
| Result3 |  | 1.3969e3 | 1.3491e3 |
| Result4 |  | 1.3954e3 | 1.3506e3 |
| Result5 |  | 1.3867e3 | 1.3224e3 |
| Result6 |  | 1.3072e3 | 1.2575e3 |
| Result7 |  | 1.4148e3 | 1.2303e3 |
| Result8 |  | 2.0638e3 |  |

With SNOPT and time-dependent gains, the effect at the swing-up doesn’t seem visible. This seems to be due to the tolerances. Once it’s down from 1e-2 to 1e-4, the result is 1.3496e3, which is the same as IPOPT. However, it should not be possible that the objective goes down once the noise levels go up. Also, it is weird that the objective is lower with a higher tolerance, which might have to do with how SNOPT works. But this doesn’t matter, because the tolerance should simply be set such that the result doesn’t change.

Also, I tried to optimize with 200 Swingups. Then, the fourth result was also lower than the first one, which means that this is not due to the amount of swingups that are used.

For speed purposes, the effect of the number of nodes on the objective is checked. Based on this result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Nodes | Objective | Objective/N\*10 | Difference | Elapsed Time |
| 200 | 80.9238 | 4.0462 | 0 | 4.190302 |
| 100 | 41.2686 | 4.1269 | 1.99 | 3.826371 |
| 80 | 33.7029 | 4.2129 | 4.12 | 7.907080 |
| 60 | 26.0332 | 4.3389 | 7.23 | 8.224538 |
| 50 | 22.5139 | 4.5028 | 11.3 | 4.706899 |
| 40 | 19.2871 | 4.8218 | 19.2 | 2.994548 |
| 20 | 16.7558 | 8.3779 | 107 | 0.516395 |