Level 2

The velocity controller from Exercise 3 was used as controller. Following the first part of the task the chosen values can be seen in the following table.

Am	500
Ao_1	1000
Ao_2	2000

1

Figure 1 shows the step responses for two different values of Ao. A force of 5000 N is applied at the time 0.03 seconds.

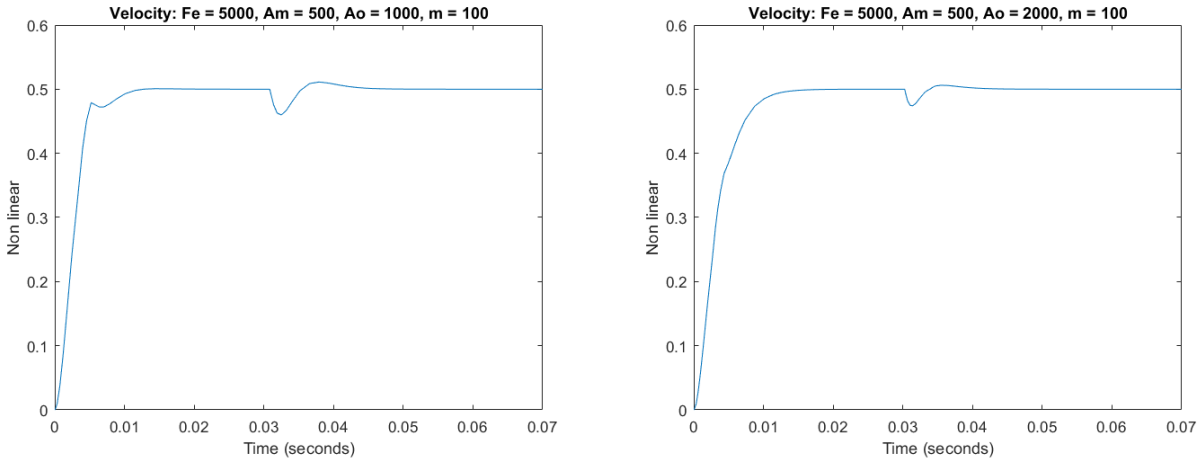

Figure 1: Comparison between the two different Ao values

2

Figure 2 shows the step responses for two different values of Ao and now with a mass of 200 kg instead of 100 kg. The system behaves more or less the same as with a mass of 100 kg.

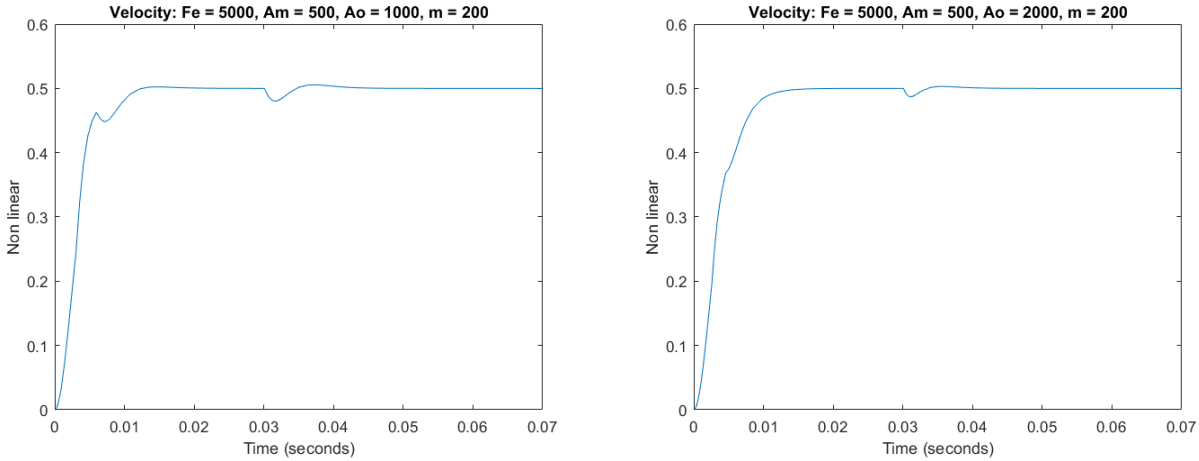

Figure 2: Comparison between the two different Ao values

3

Figure 3 shows the step responses for two different values of Ao with a sine wave as noise. The sine wave has a frequency of 1700 rad/s.

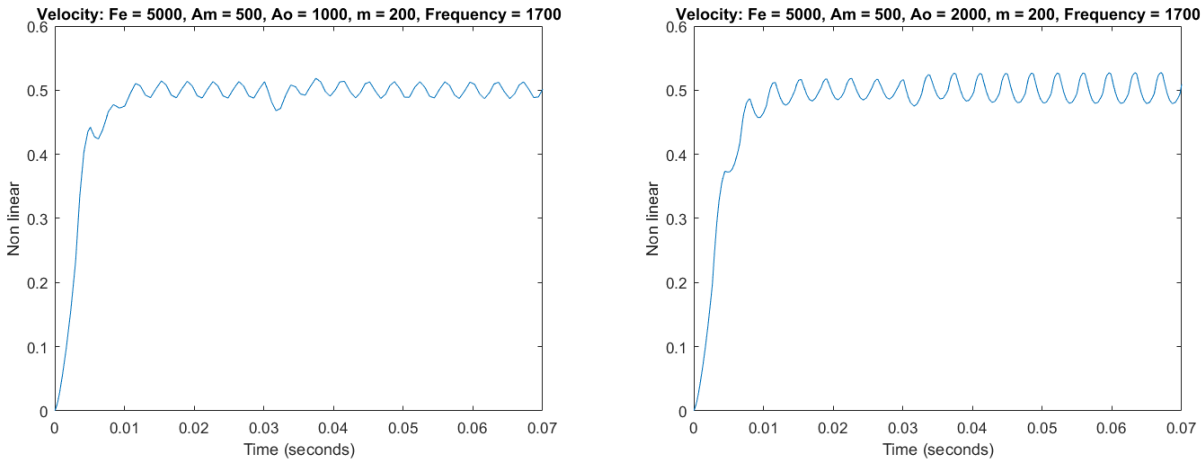

Figure 3: Comparison between the two different Ao values

Figure 4 shows the complementary sensitivity function for the two different Ao values. The magnitude when the frequency is 1700 rad/s is shown which shows that a lower Ao value dampens the noise more. It was hard to find a frequency were the noise dampening were very noticeable but the dampening can be seen in Figure 3 were the noise affects the system less when Ao=1000 compared to Ao=2000.

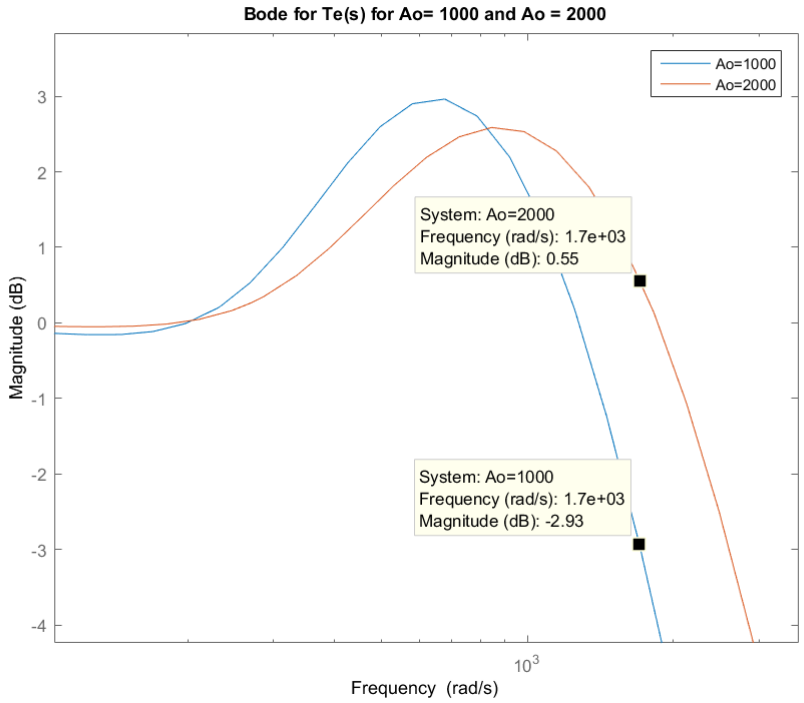

Figure 4: Comparison between the complementary sensitivity functions