

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.

A_m	500
A_{o1}	1000
A_{o2}	2000

0.1

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

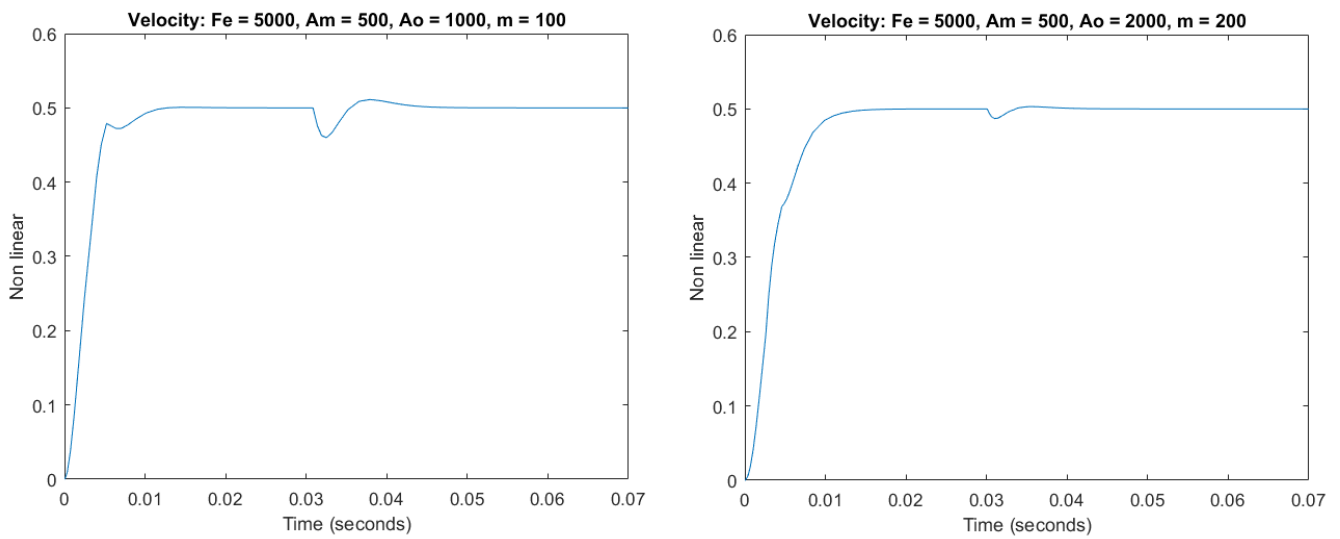


Figure 1: Comparison between the two different A_o values

0.2

Figure 2 shows the step responses for two different values of A_o 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.

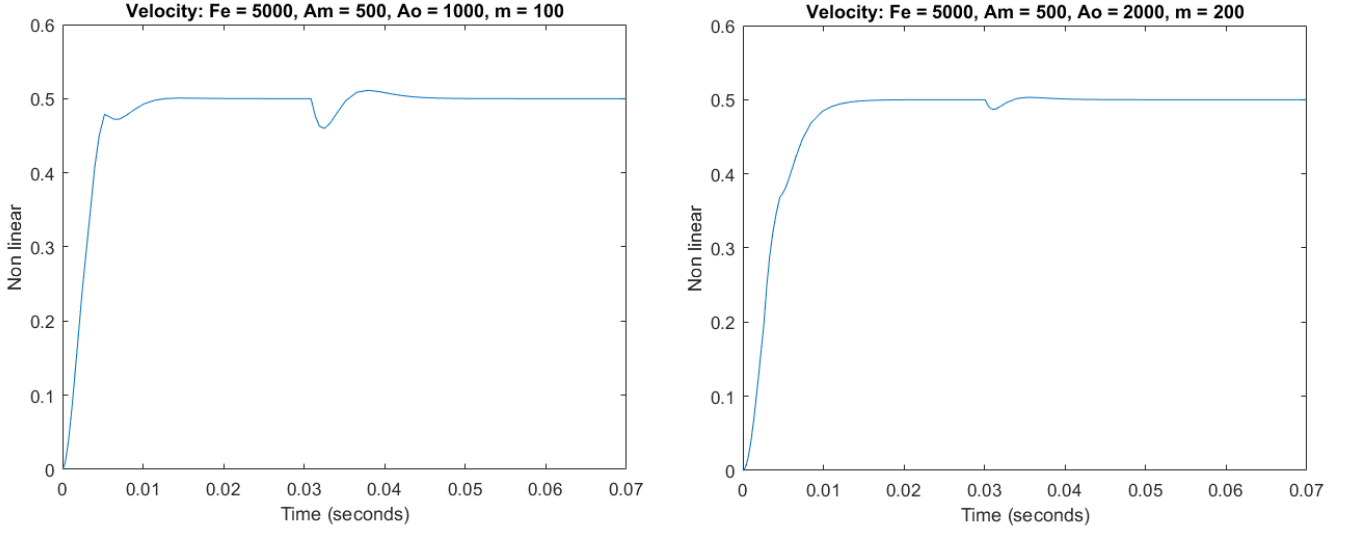


Figure 2: Comparison between the two different A_o values

0.3

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

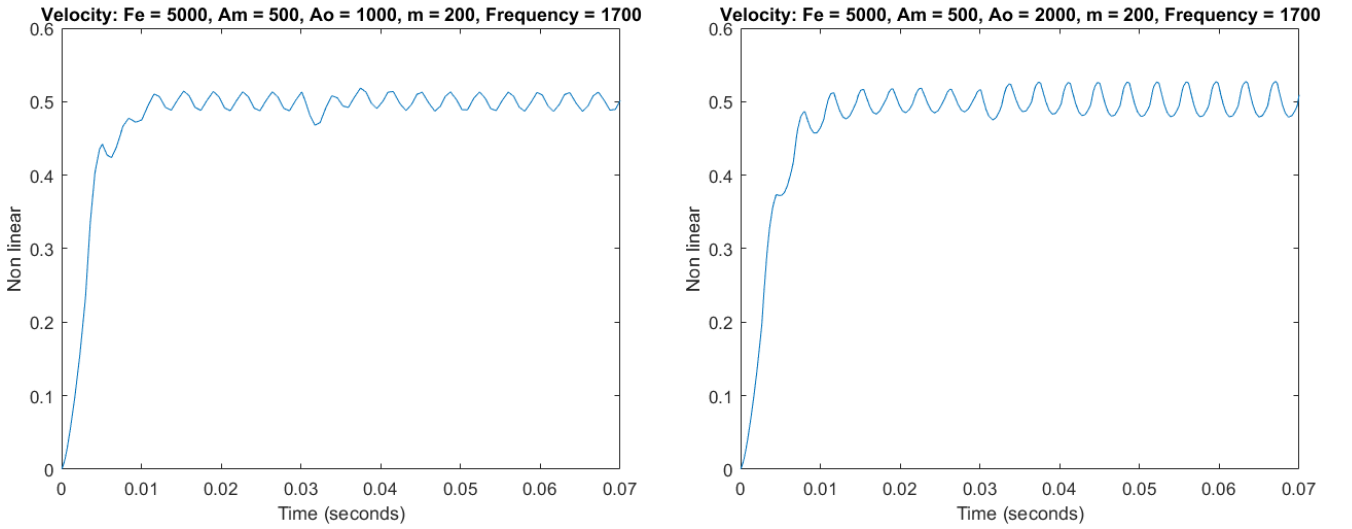


Figure 3: Comparison between the two different A_o values

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

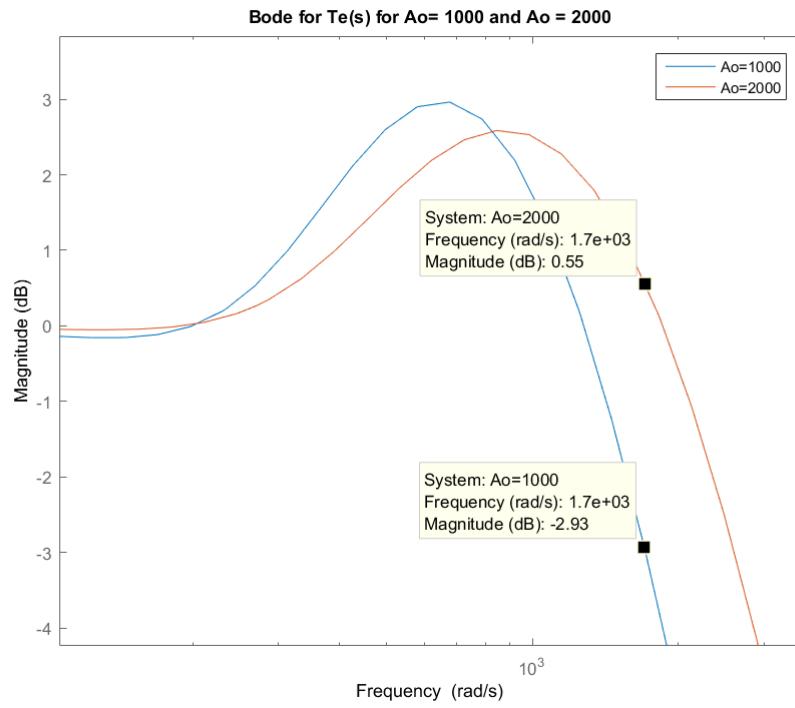


Figure 4: Comparison between the two different A_o values