Lab Sheet 2 – ANSWER SHEET

Introduction to Simulink

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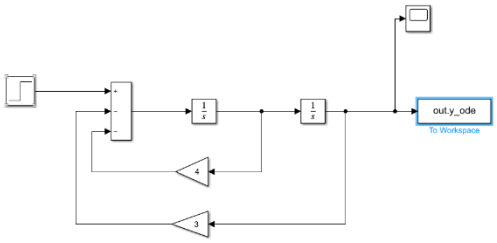


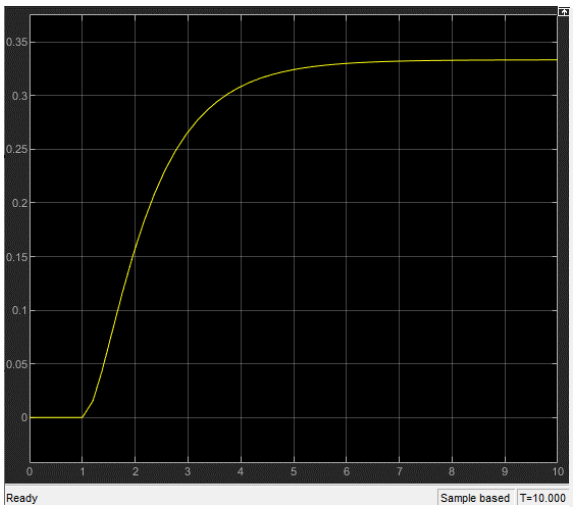
Ex.1: Differential equation model in Simulink

Plot of output attached? **Yes**
(Make sure all graphs are labelled)

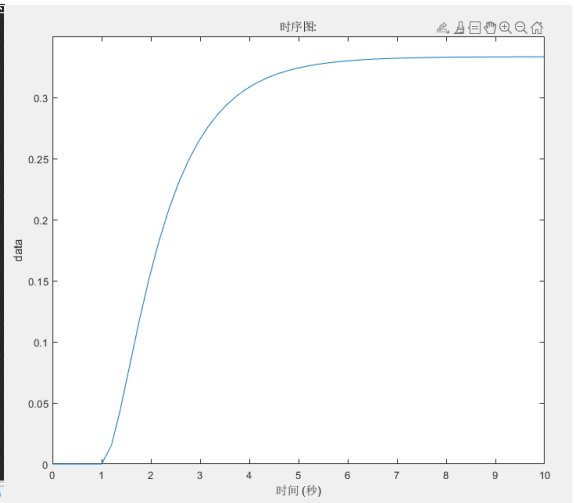
What is the final value of the output?
About 0.33
Plot of new output attached? **Yes**

Compare both plots (in terms of the start and end values in particular):

The two images are basically the same, with the same initial and final values



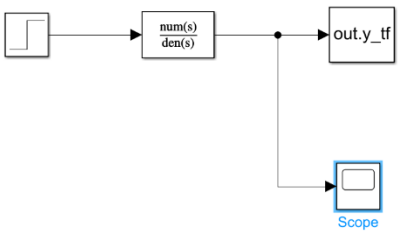
Figure①



Figure②

Ex.2: Transfer function model in Simulink

Plot of output attached? **Yes**

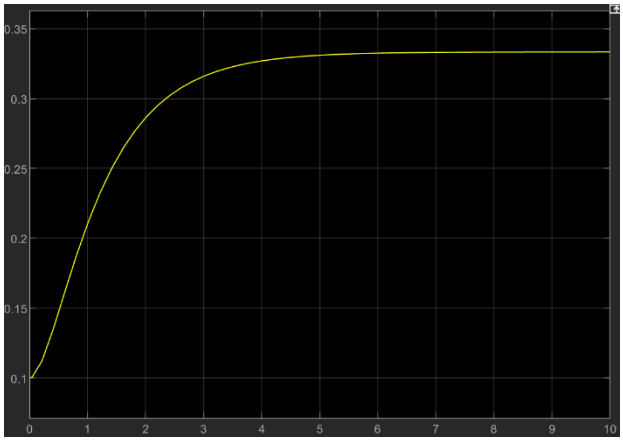


Does this match the ODE output in Ex.1?

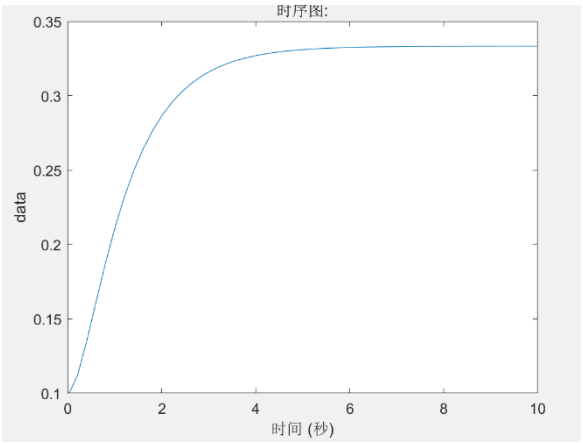
It does not match.

Comment on the possibility of implementing non-zero initial conditions in a transfer function model:

First of all, the ordinate value of the function can only start at 0.Meanwhile the transfer function is only an incomplete description of the internal structure of a system, representing only that part of it which is directly or indirectly controlled by the input and observable from the output.

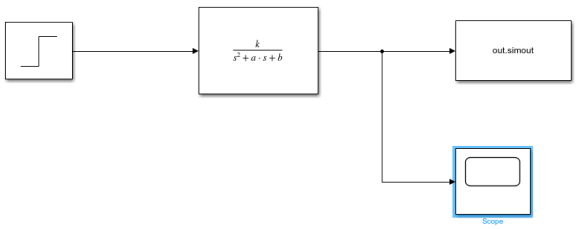


Figure③



Figure④

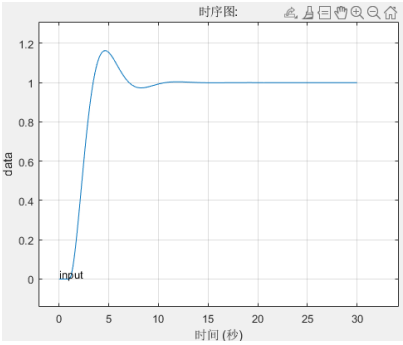
Ex.3: Analysing a system using Matlab/Simulink



Simulink model attached? **Yes**

Plot of both input and output attached? **Yes**

(Label each response and display grid lines)

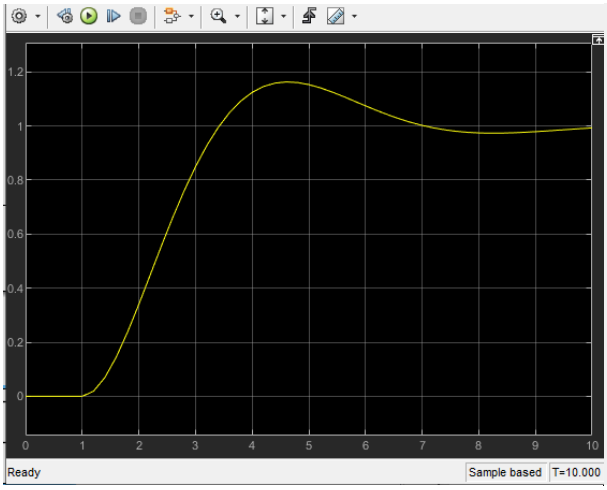


What is the final output of the system response?

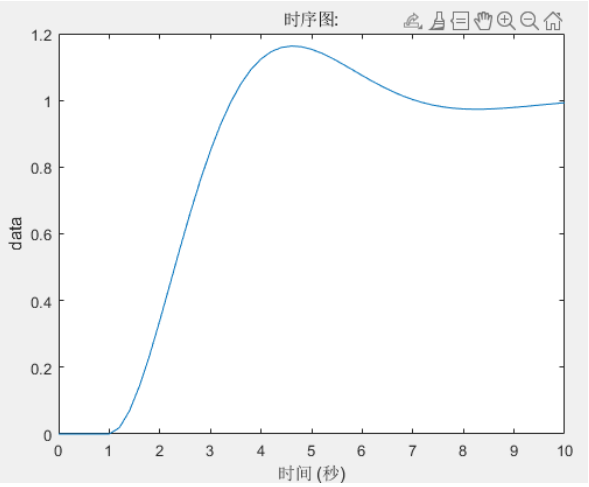
1.000

What is the maximum value of the system response?

1.163



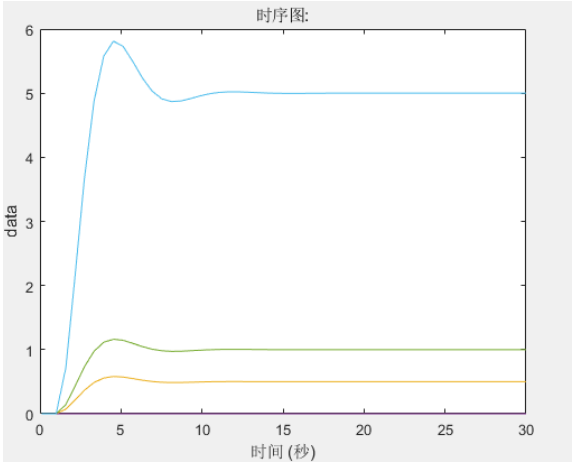
Figure⑤



Figure⑥

The effect of changing k …

Plot of 4 responses attached? **Yes**

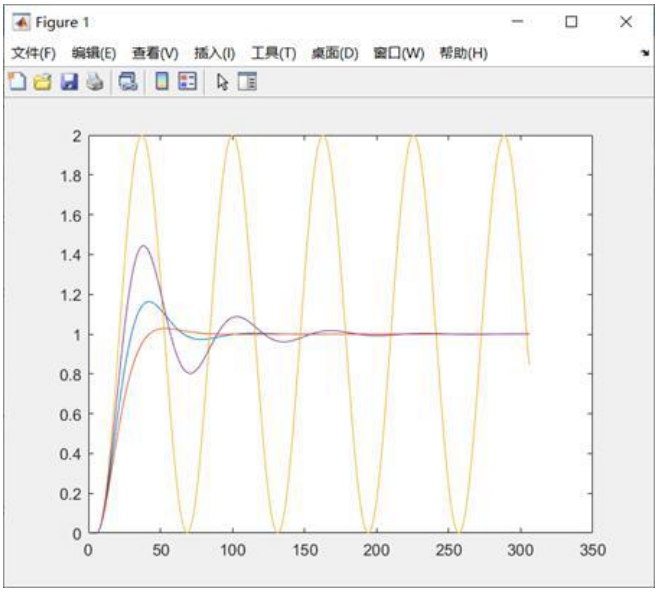


How does changing '*k*' affect the system output?

'k' has effect on the value of the system output , it means that K defines the magnification (or magnitude change) between steady state input and the steady state output of the first order system

The effect of changing a …

Plot of 4 responses attached? **Yes**

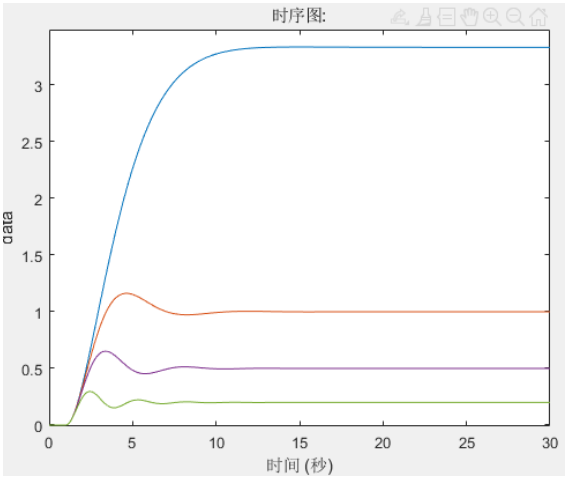


How does changing '*a*' affect the system output?

a=1 critical damping just no overshoot
0<a<1 underdamped and some decaying oscillations
a>1 overdamped no oscillations and similar to first order response
a=0 undamped oscillates

The effect of changing b …

Plot of 4 responses attached? **Yes**



How does changing '*b*' affect the system output?
'b' has the effect on the value and the fluctuation of the system output——the smaller b is, the smaller the fluctuation of the graph is and the larger the value of the function is.