

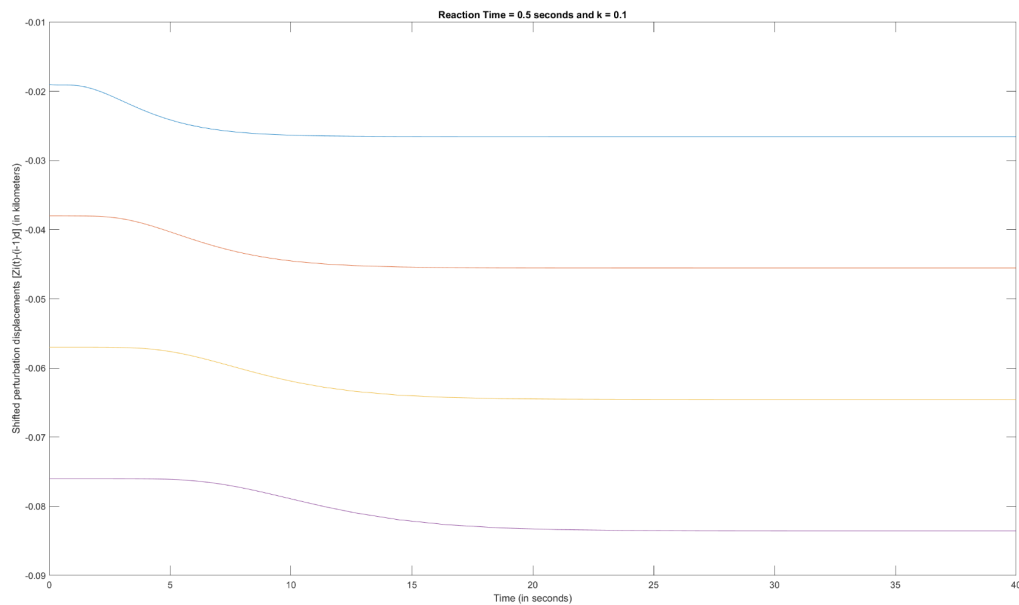
MA5710 Assignment-1 Question 2

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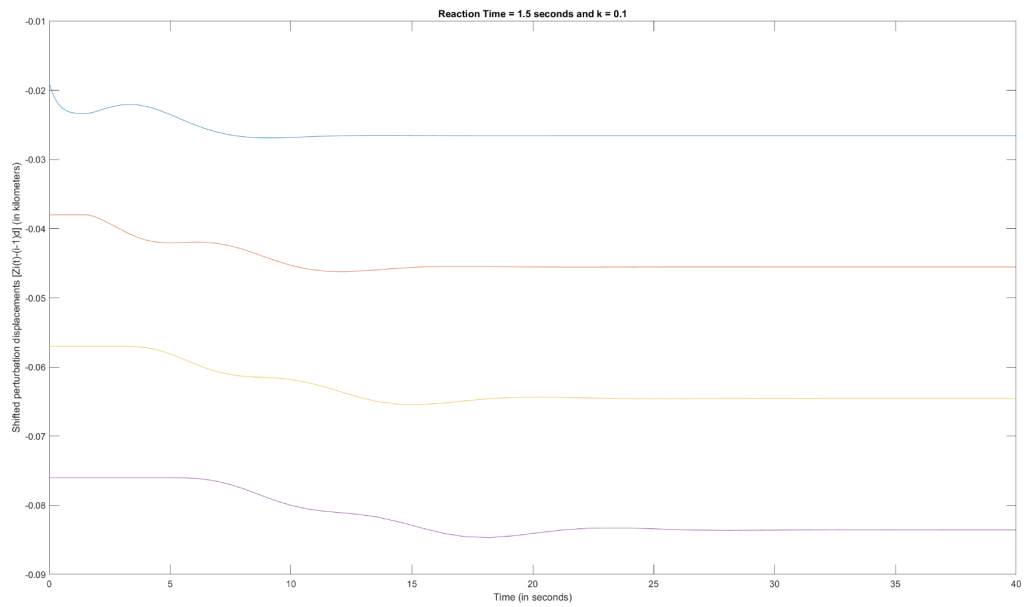
Roll Number - BE19B032

For the given data, the plots found using RK method are given as:

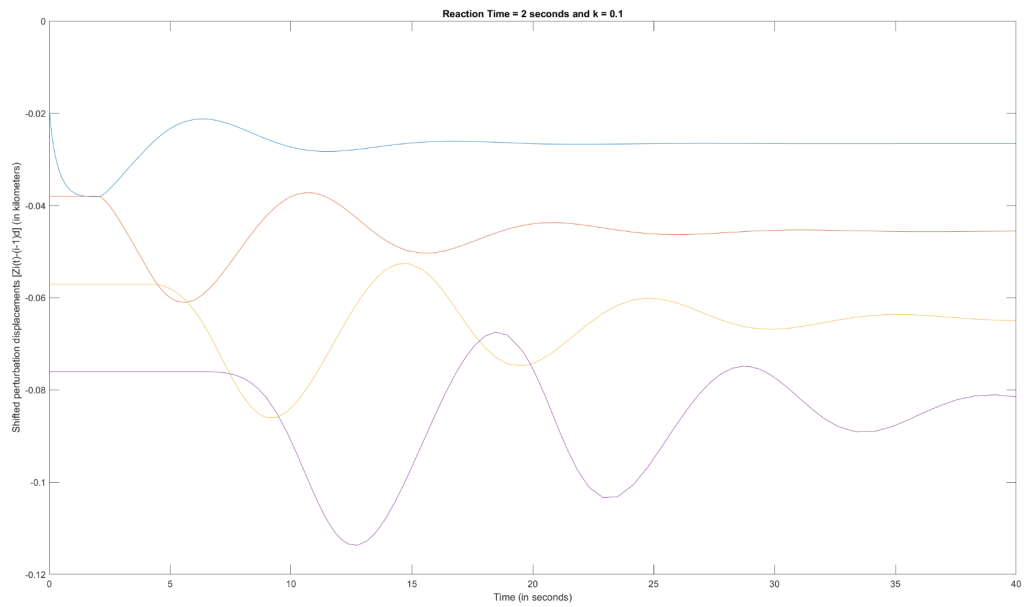
1) $k = 0.1$



Plot for $k = 0.1$ and driver's reaction time = 0.5 seconds



Plot for $k = 0.1$ and driver's reaction time = 1.5 seconds

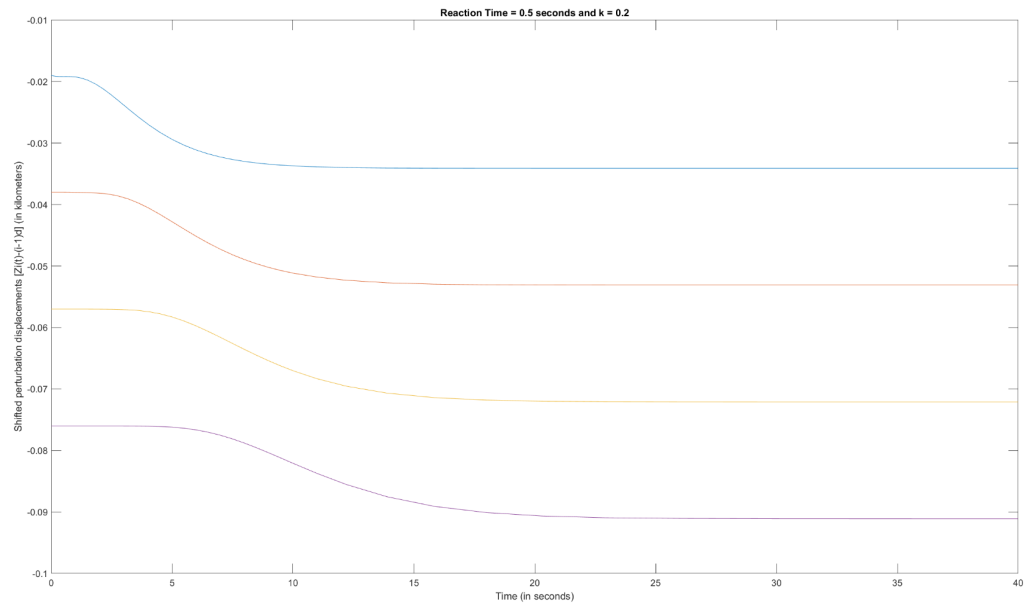


Plot for $k = 0.1$ and driver's reaction time = 2 seconds

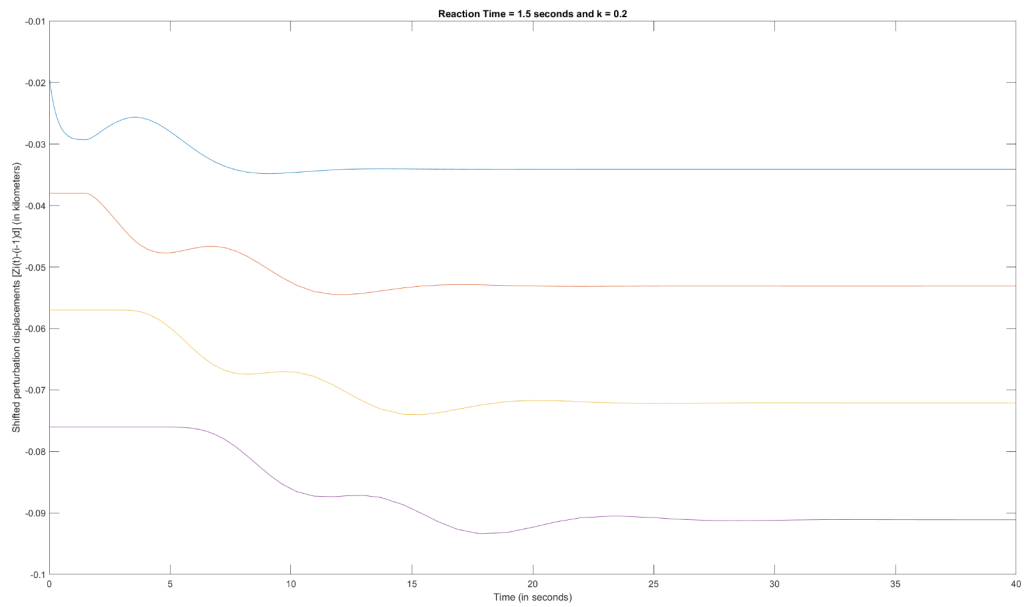
$T_{\text{collision}} = 1.512 \text{ seconds}$

The model would be valid only for the first two cars in this scenario.

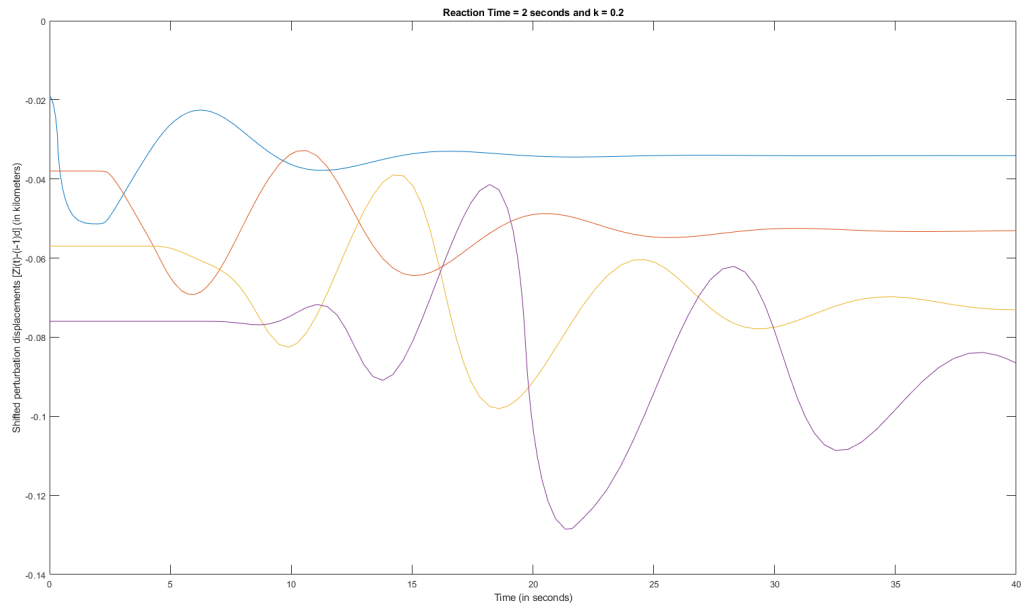
2) $k = 0.2$



Plot for $k = 0.2$ and driver's reaction time = 0.5 seconds



Plot for $k = 0.2$ and driver's reaction time = 1.5 seconds



Plot for $k = 0.2$ and driver's reaction time = 2 seconds

Running the code for RK method on this DDE for $k = 0.2$ and reaction time = 2 seconds gives us a warning on MATLAB:

Warning: Imaginary parts of complex X and/or Y arguments ignored.

Looking at the plot, it's fairly certain that the model won't be valid for such a situation.

PS: It is suggested to read this document at 167% of its original size for good readability of the graphs.

References:

- 1) Prof. Sundar's Class Notes
- 2) <http://matlab.imm.uran.ru/mirrors/www.cs.runet.edu/~thompson/webddes/tutorial.html>
- 3) https://youtu.be/ius6XN3hj_U
- 4) <https://youtu.be/TCWrD3cZG9s>