REPORT EE746 Assignment 2

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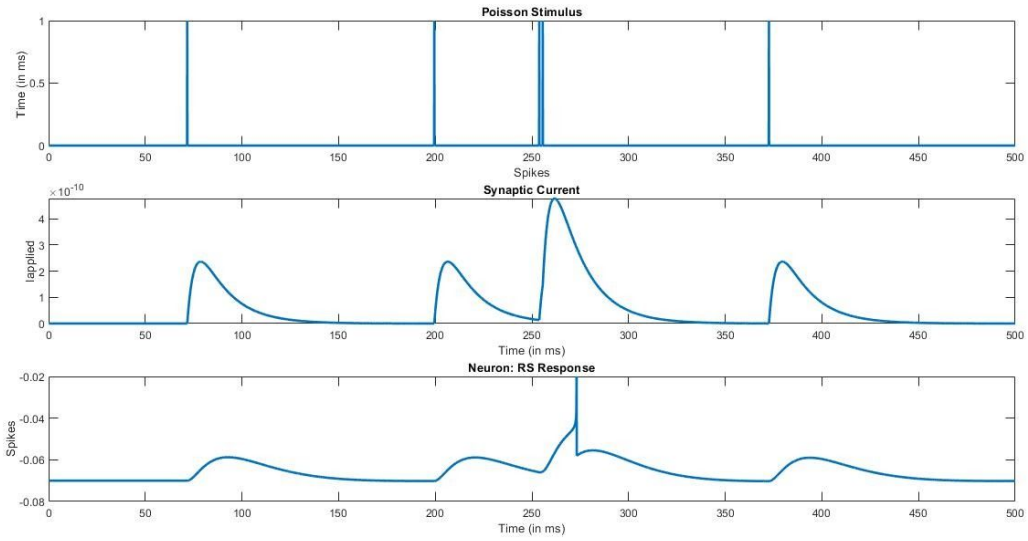
Problem 1)



Time Instants: 0.030500, 0.059700, 0.083800, 0.131800, 0.296700

It can also be seen that spikes are produced for stimulus close enough.

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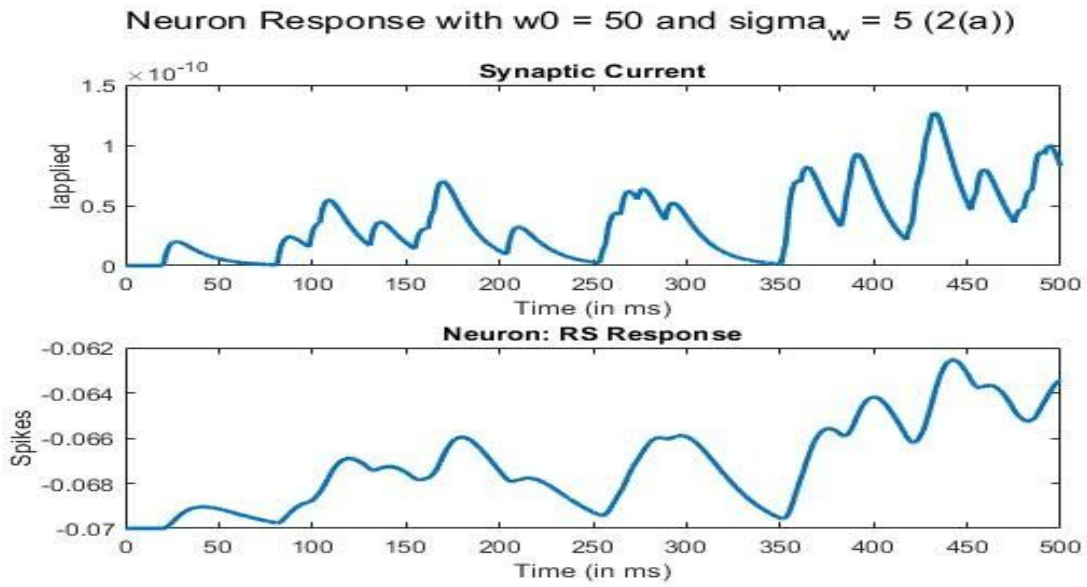
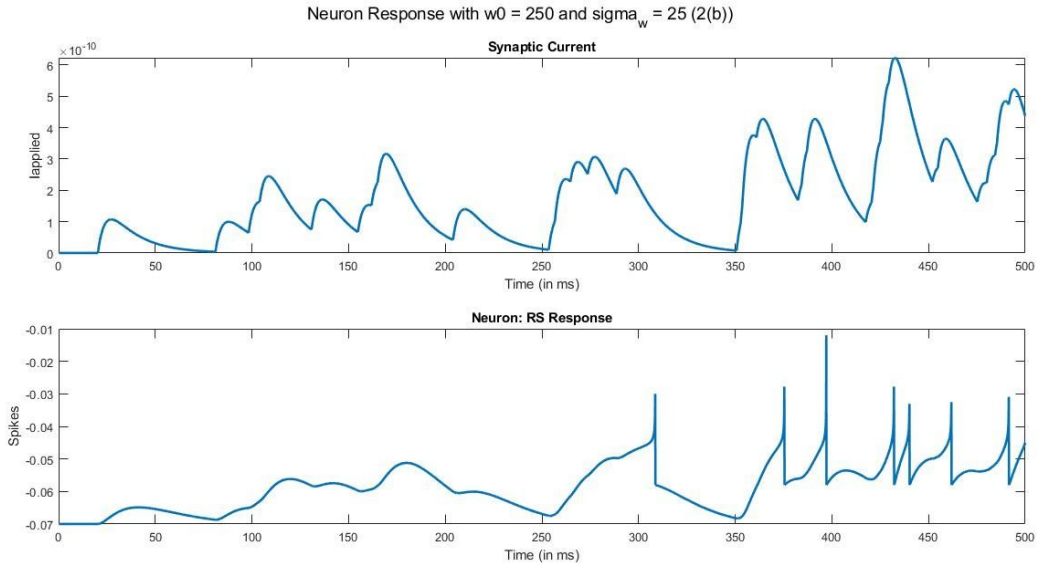
Problem 2)

Part(a)



No spikes are produced for given synaptic strength

Part(b)



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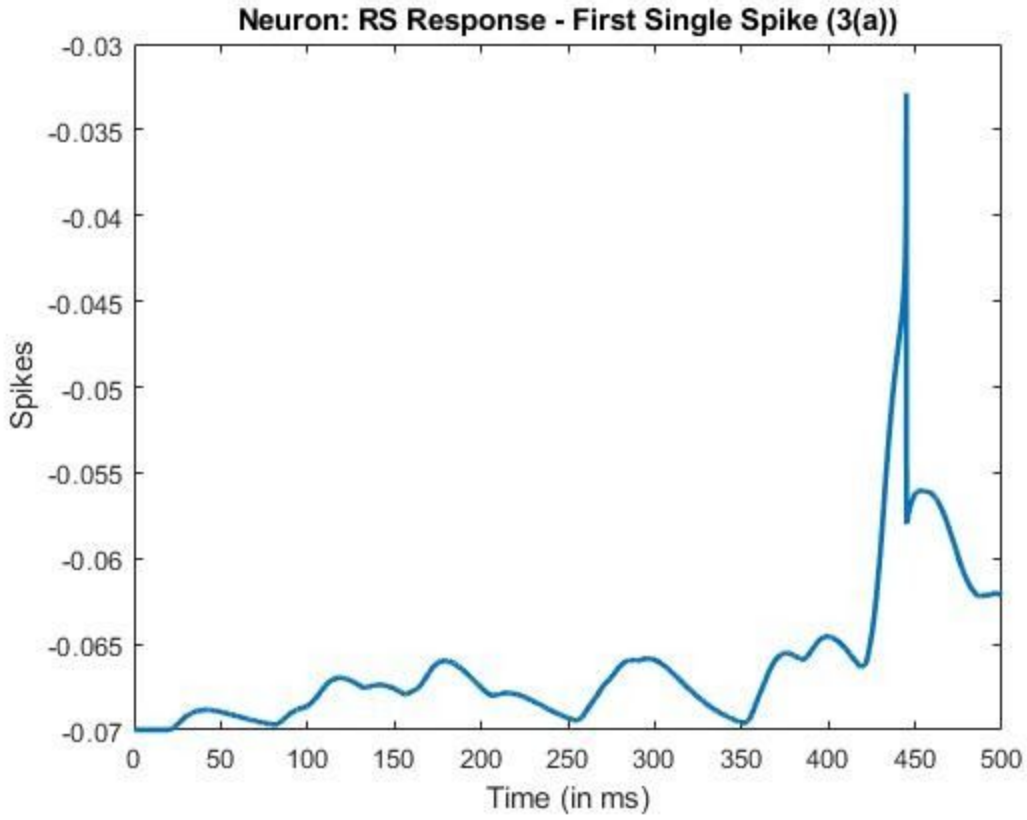
7 spikes are observed in the Neuron Response due to increased synaptic strength

Problem 3)



Resultant weights:

52.8486,45.5176,51.1609,49.8092,60.4138,56.5103,54.8177,51.8385,55.4713,45.5911,47.5204,54.1263,52.31,51.937,55.0004,57.3977,44.0231,50.1373,51.408,51.5498,51.398,61.3251,42.4393,191.1117,49.493,58.6477,50.4284,50.5703,113.2638,161.2336,43.3637,44.7252,41.0304,46.8049,41.864,54.4165,48.0828,128.7328,42.7754,40.6479,48.7243,49.6944,55.9598,48.4523,58.7985,47.6183,40.5627,53.2008,52.1632,51.5078,52.9657,50.9764,55.7575,43.1281,249.1592,46.023,163.9875,51.2979,50.5984,42.565,49.4822,59.045,50.3836,49.3329,51.4819,48.9373,57.1009,45.1867,52.9976,55.5062,58.1604,56.2945,51.7784,49.7458,48.8303,50.3939,45.2311,42.4762,57.5466,43.0224,49.1439,45.8734,49.2711,49.4379,45.3513,54.321,46.4335,60.7914,45.7974,59.5074,46.0456,48.8666,51.5427,44.1533,55.7715,49.3534,39.2616,54.0936,49.133,48.4722

Mean = 57.3, ST_DEV = 30.5

Number of Iterations = 7

Part(b)

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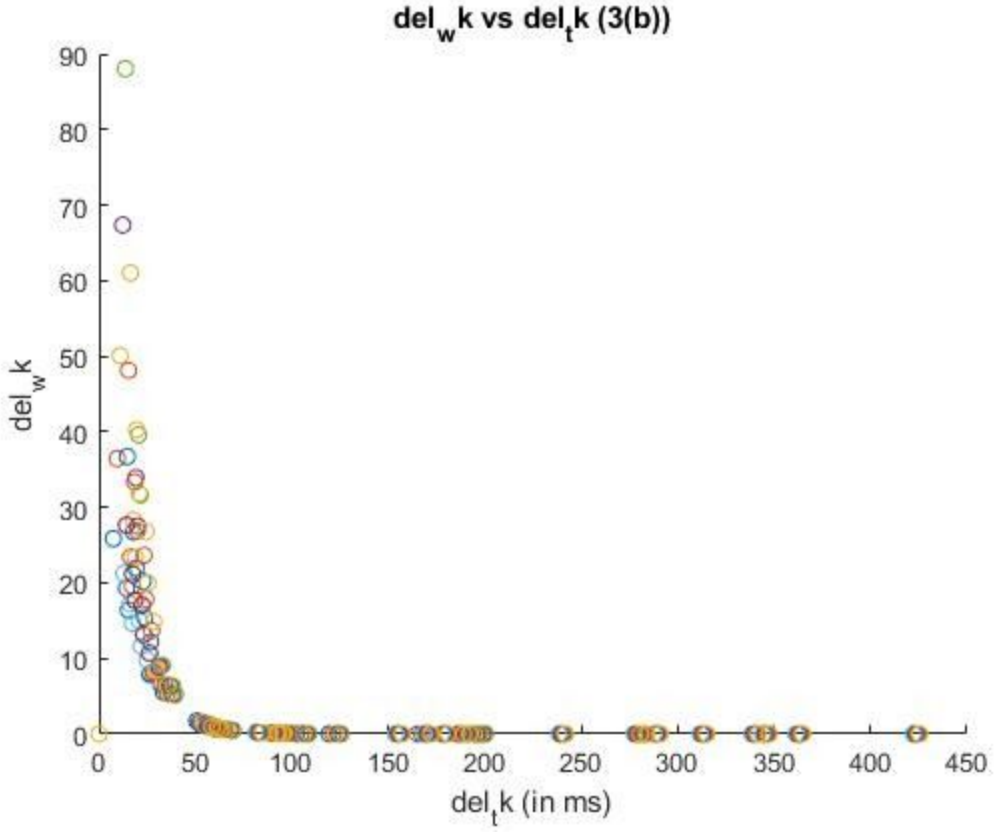
(Plotted for different iterations, different weight reduced synapse)



Problem(4)

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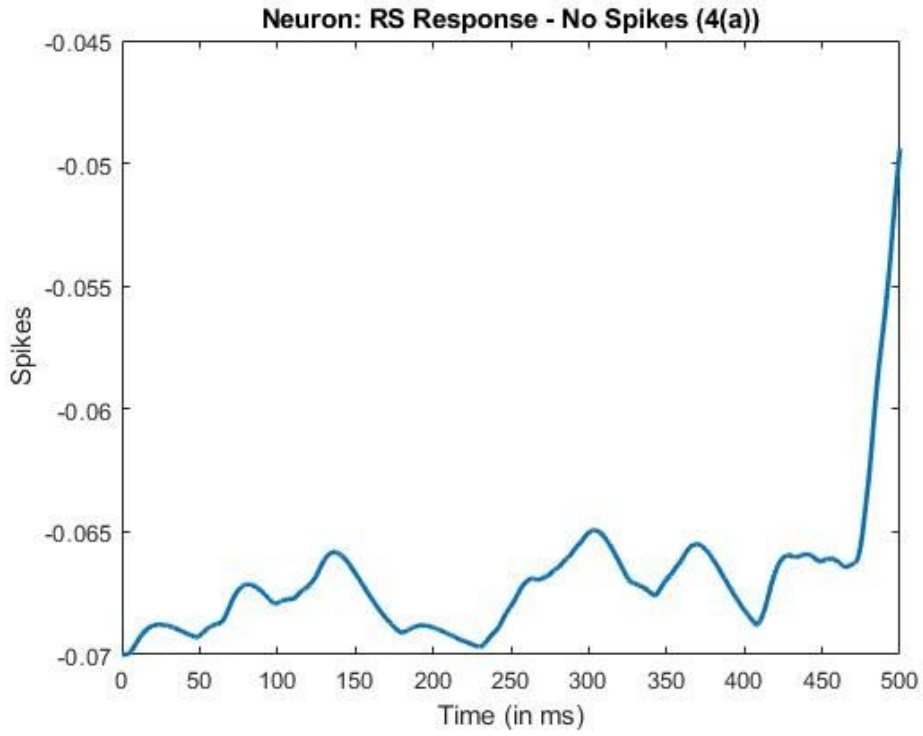

Iterations = 37

Resultant weights:

248.5433,285.9578,232.7662,257.6593,231.2791,260.8752,257.4064,308.3197,280.1568,246.2927,252.9033,221.3825,269.2005,130.2708,221.909,295.7728,244.6455,267.5413,184.6897,245.8284,245.9,262.5134,264.3275,278.6109,249.0202,224.6014,245.393,176.3577,233.476,272.4682,185.2746,215.6965,230.6292,270.4811,272.1881,343.2929,249.4772,264.1414,255.1089,270.2614,277.6062,173.0848,143.6424,265.4663,219.4347,194.5342,239.1379,245.9682,272.2253,252.8493,224.9012,154.5698,124.534,154.9456,259.1079,241.6012,249.9333,229.1513,233.6954,274.2401,245.5935,158.9324,262.0106,249.8049,248.249,213.2774,222.3429,265.452,258.5419,246.7985,258.8659,202.3402,267.38,242.3002,234.8634,257.1615,270.9548,269.4848,233.5546,249.026,235.5101,183.4255,196.2144,208.4678,263.7255,252.0918,202.2548,256.2694,258.5955,379.7406,263.9033,154.3113,146.4247,235.4615,231.6311,280.5895,284.2037,241.3945,278.0072,228.8387

Mean = 238.16
SD = 37.977

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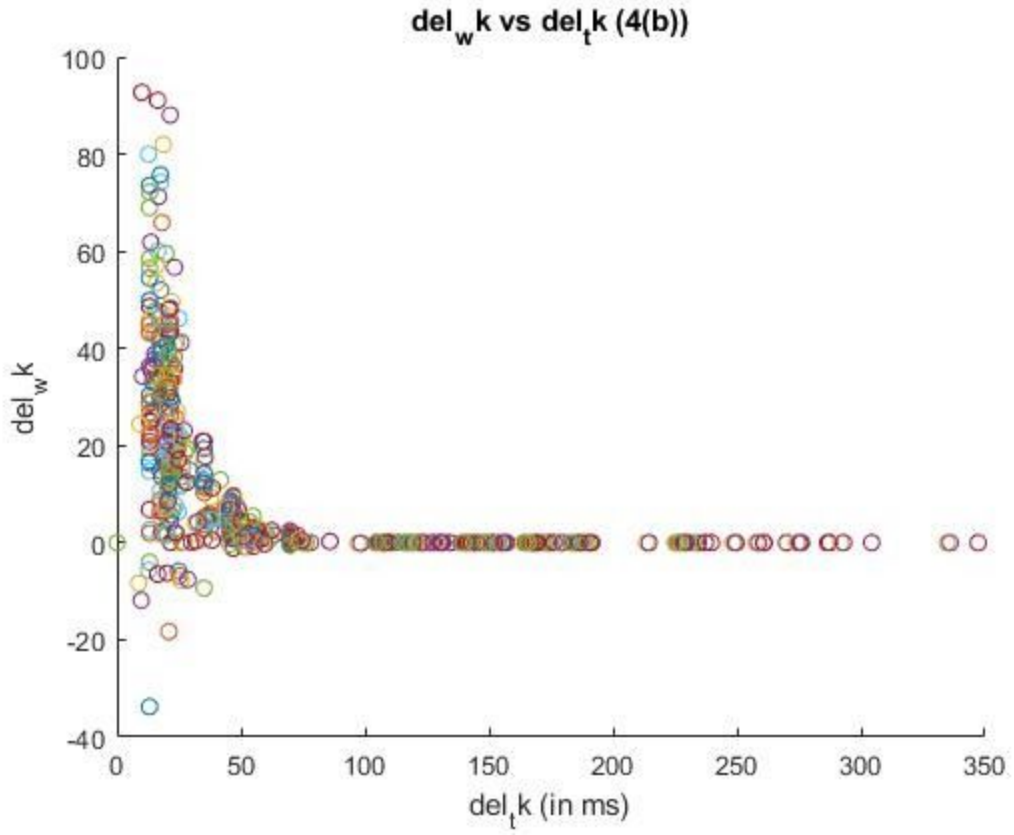

Problem 5)

Part(a)

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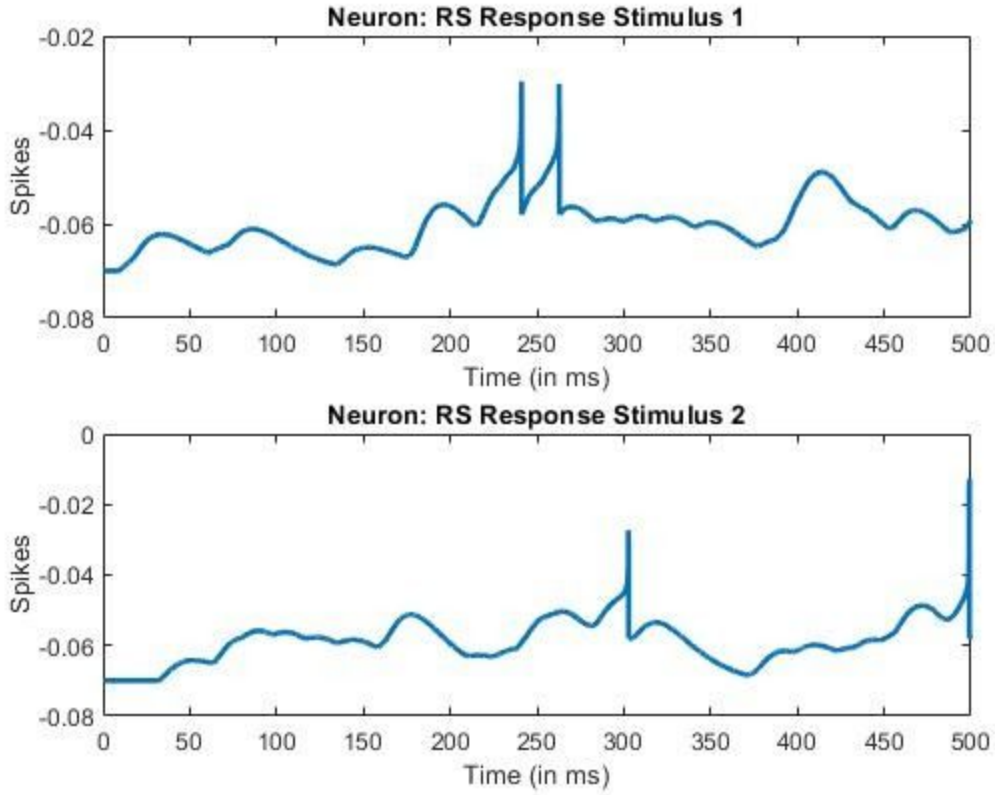
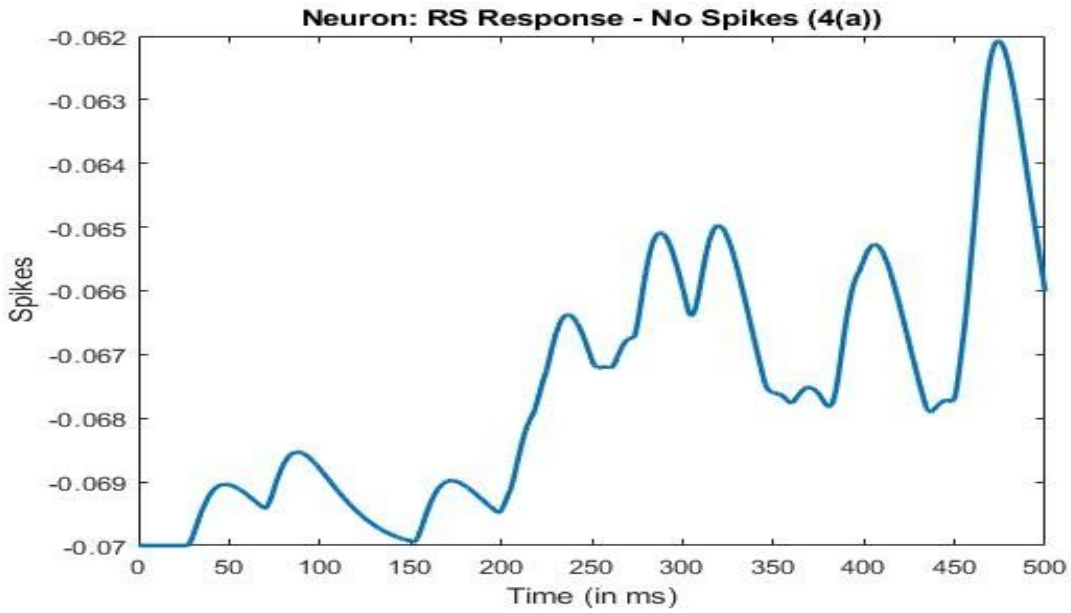


Part(b)



Stimulus S2 spikes removed using the same code as in Problem(4). It can be seen that it isn't the original stimulus S2 of Part(a) as for Part(c) & (d) ,

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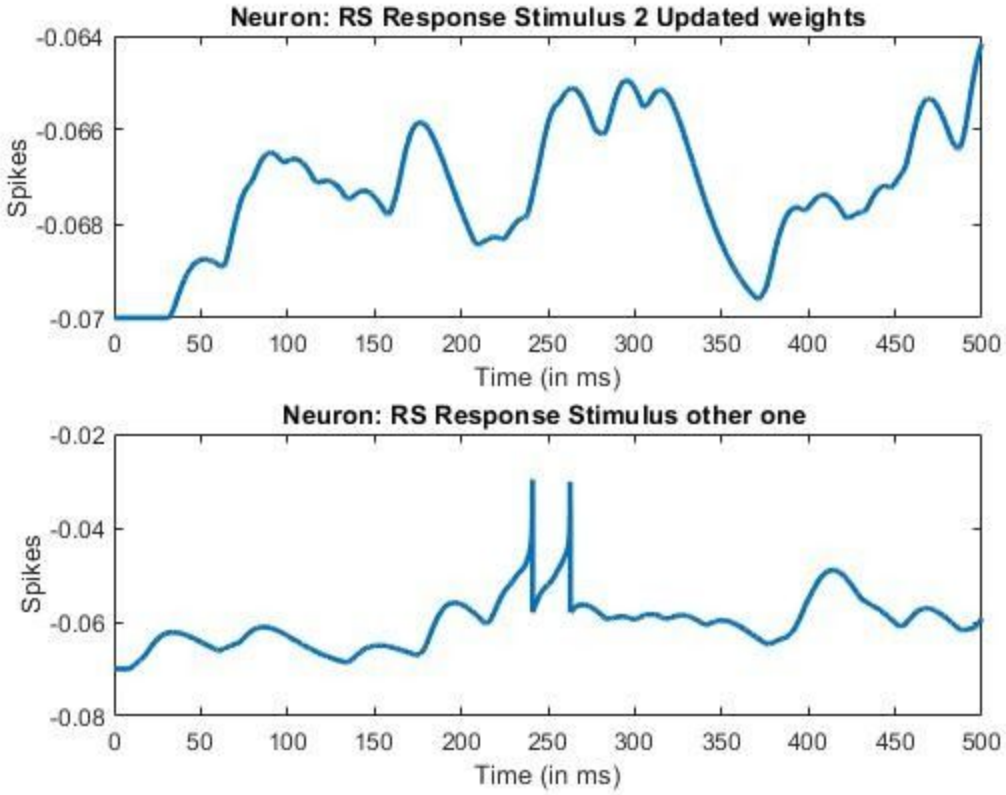
code of problem(4) was ran and new image used to overlap instantly. Hence, for capturing this, 5a and 5b were simulated first and then the entire problem 5!!

Part(c)



Algorithm:

1) Remove weights of stimulus S2 from part(b) - using code of 4(a)
2) Use these weights (mean, SD calculated), with stimulus S1, to obtain its response
3) If no spikes produced, obtain new weights of S1 using code of 3(a)
4) Use these weights (mean, SD calculated), with stimulus S2, to obtain its response
5) Repeat step 2 until spikes are observed in the response of S1

W1 : mean = 197.68 ,SD = 24.841

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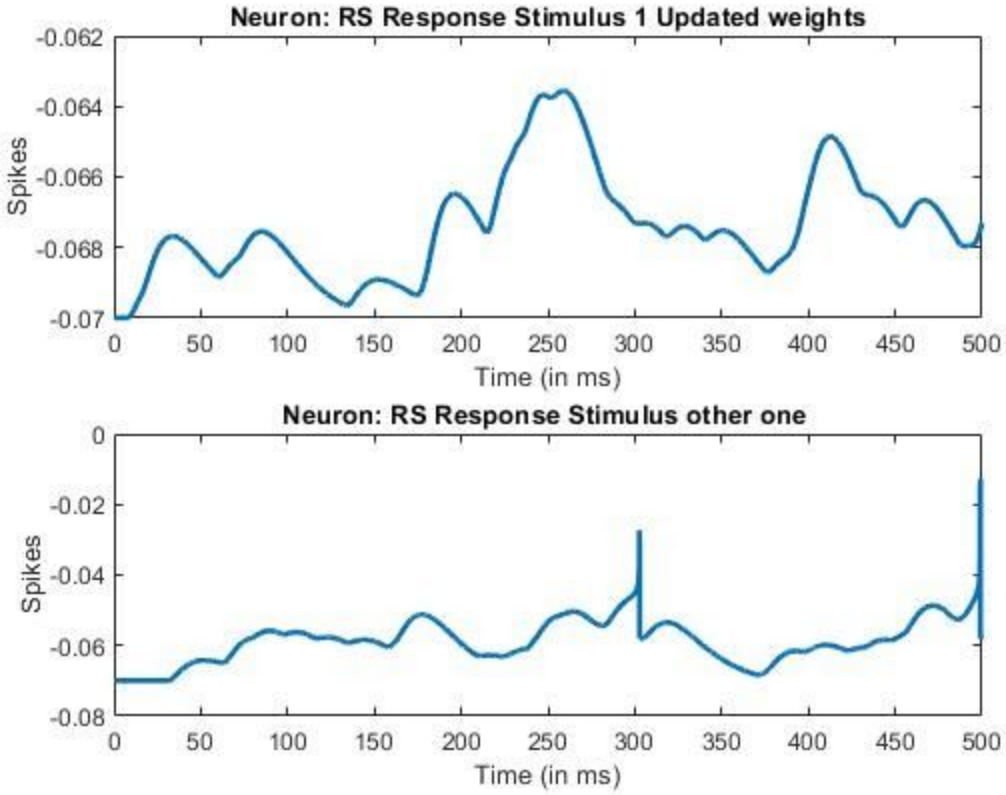

Same algorithm implemented as before, just stimuli interchanged (can be seen from the code also)

W2: mean = 194.69, SD = 27.458