مدل LIF:

$$\tau.\frac{du}{dt} = -(u - u_{rest}) + R.I(t)$$

مدل ALIF:

$$\tau_m.\frac{du}{dt} = F(u) - R\sum_k W_k + R.I(t)$$

$$\tau_k.\frac{dw_k}{dt} = a_k(u - u_{rest}) - w_k + b_k\tau_k\sum_{t^f}\delta(t - t^f)$$

مدل AELIF:

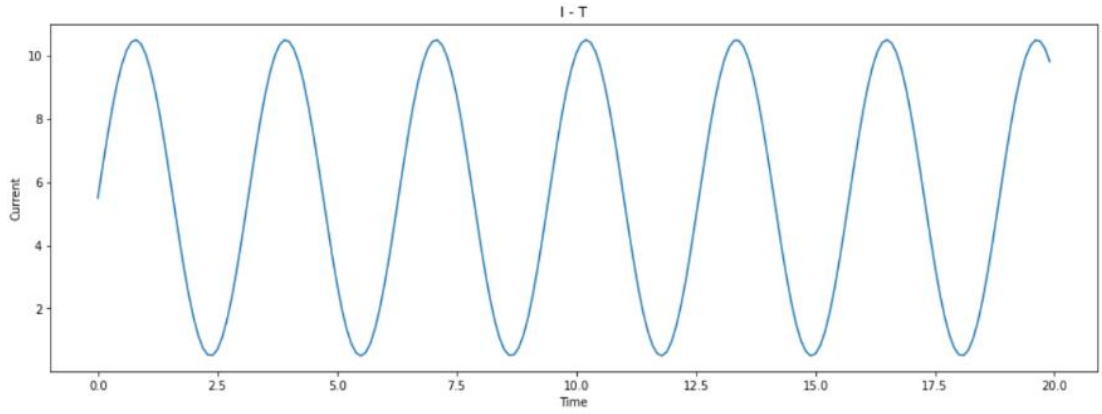
$$\tau_m.\frac{du}{dt} = -(u - u_{rest}) + \Delta_T\exp\left(\frac{u - \theta_{rh}}{\Delta_T}\right) - Rw + R.I(t)$$

$$\tau_w.\frac{dw}{dt} = a(u - u_{rest}) - w + b\tau_w\sum_{t^f}\delta(t - t^f)$$

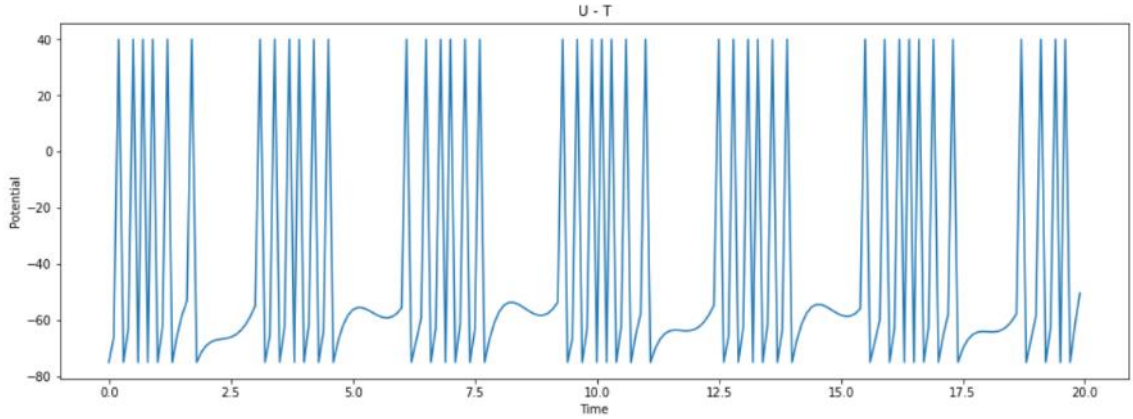
مقادیر اولیه:

$u_{rest} = -70\ mV$	$u_{threshold} = -50mV$	$u_{spike} = 40mV$
$u_{reset} = -75mV$	$R = 10\ Mohm$	$\tau_m = 8\ ms$
$\tau_w = 100\ ms$	$a = 0.5$	$b = 0.5\ nA$

$$I(t) = \left(sit\left(\frac{t}{5}\right) + 1.1 \right) * 5$$



LIF:



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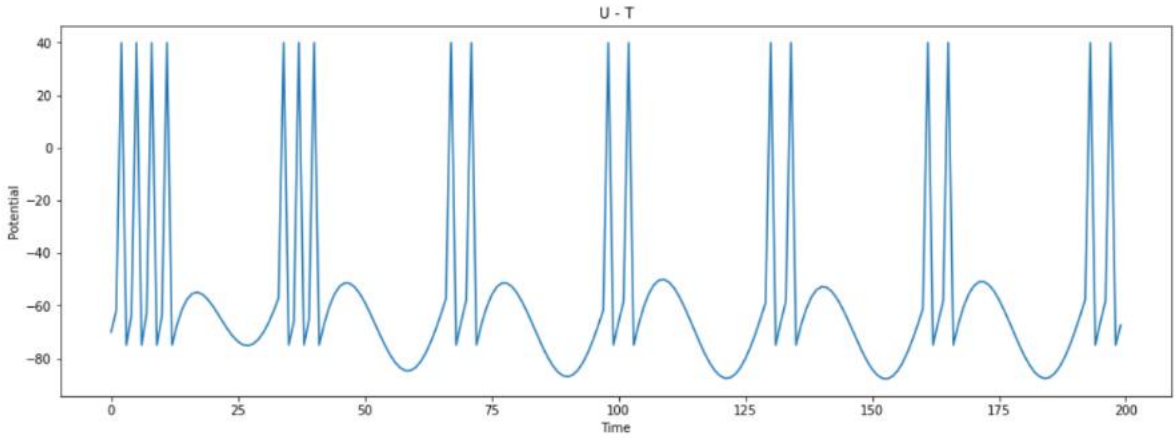
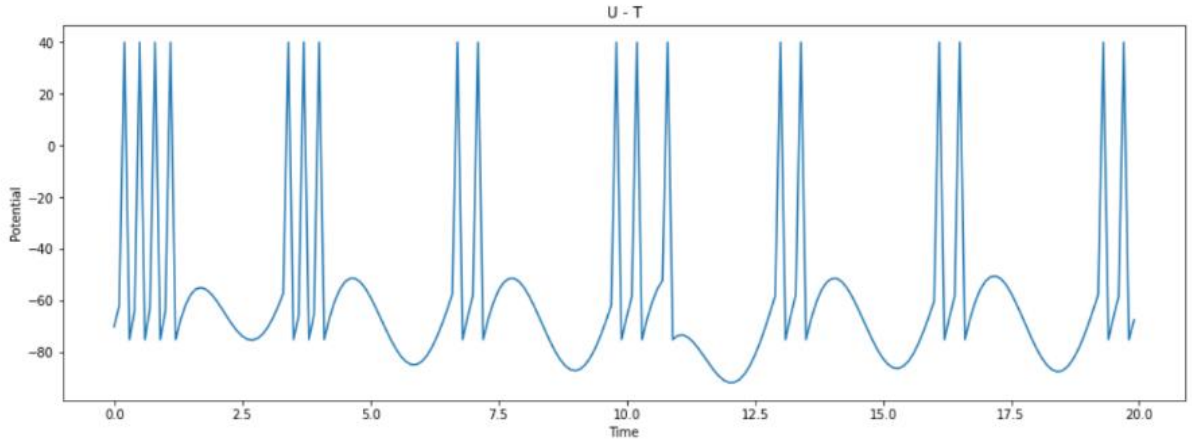
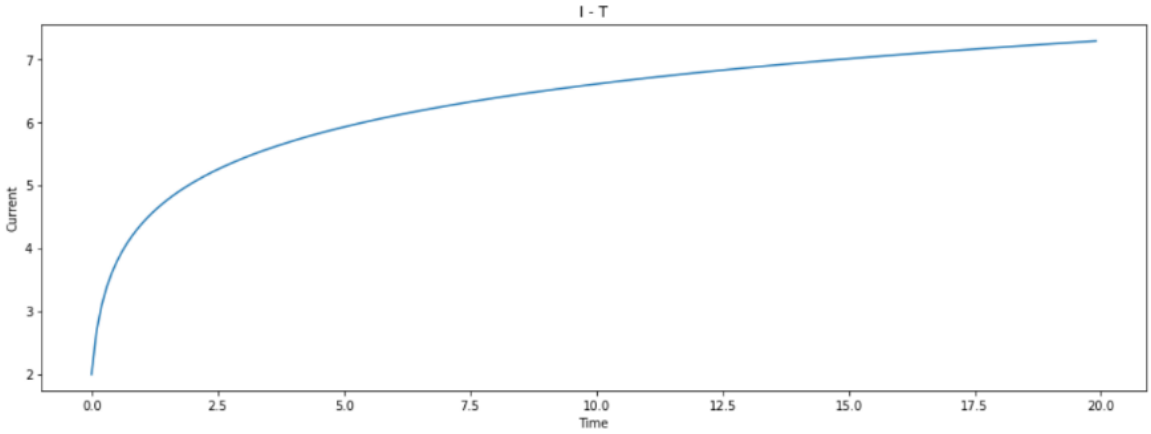


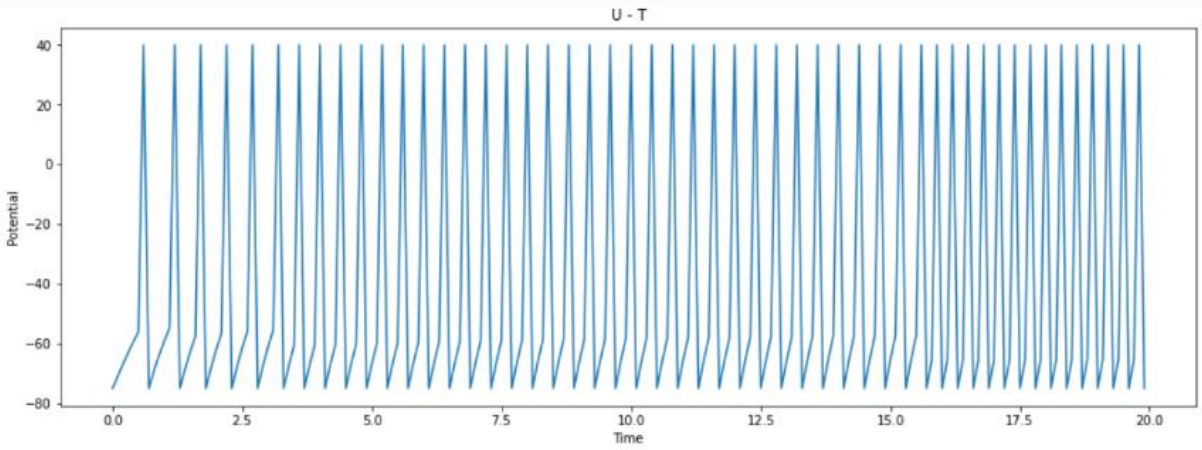
AELIF:



$$I(t) = \log(t+1) + 5$$



LIF:



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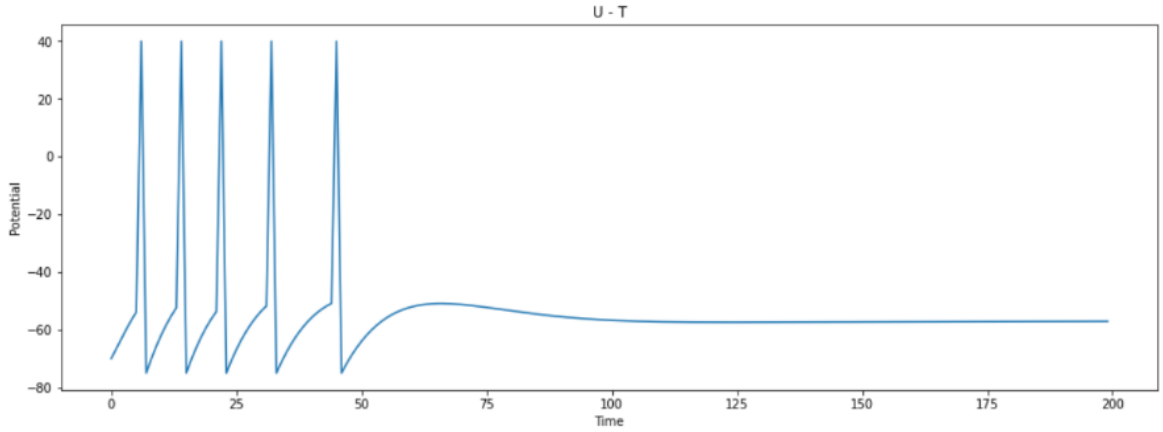
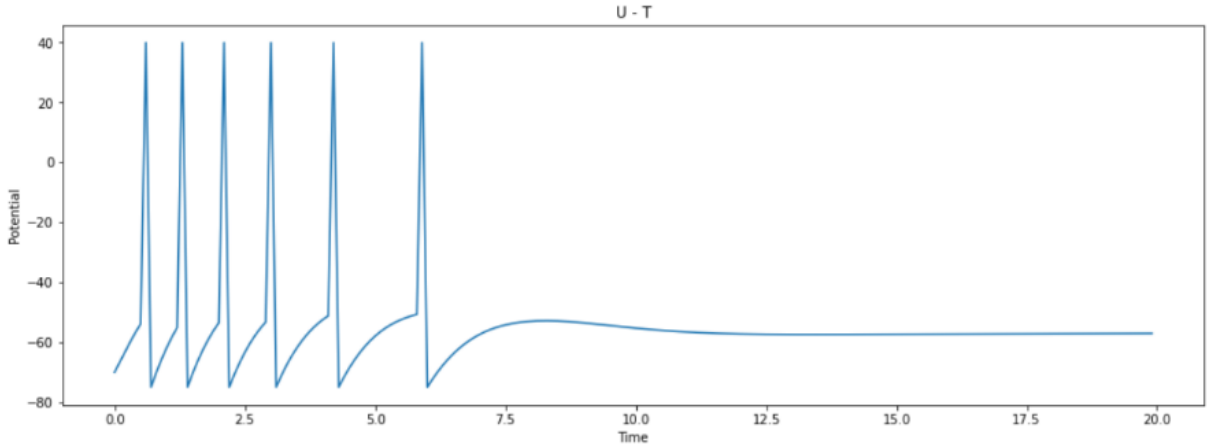
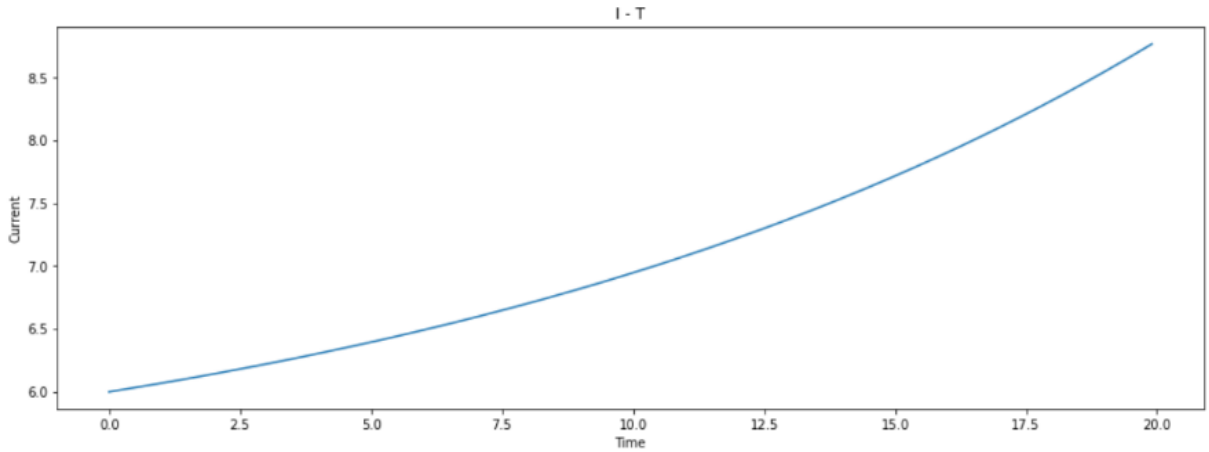


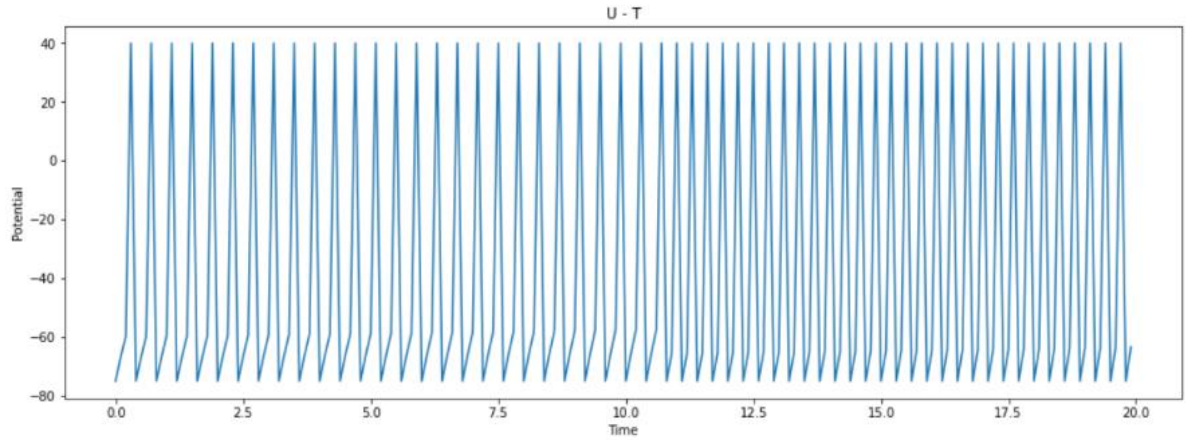
AELIF:



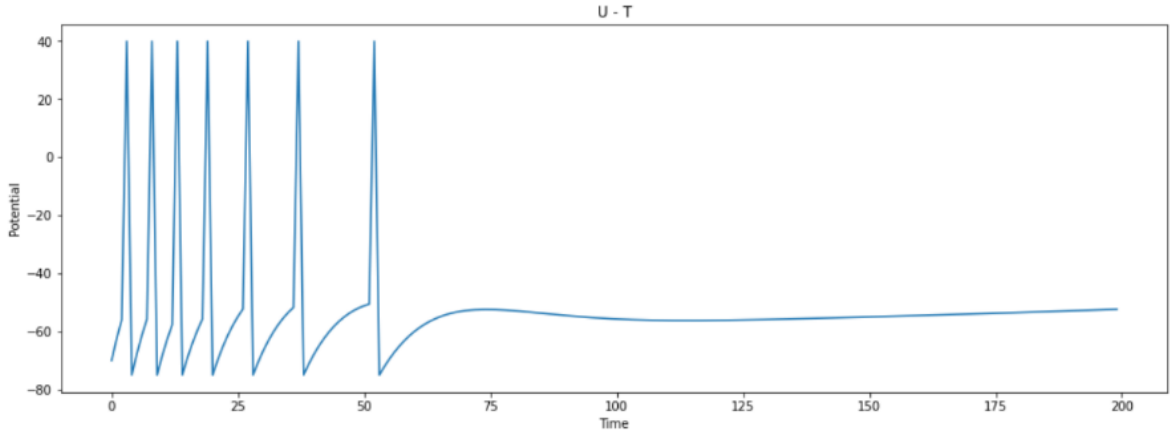
$$I(t) = e^{\frac{t}{150}} + 5$$



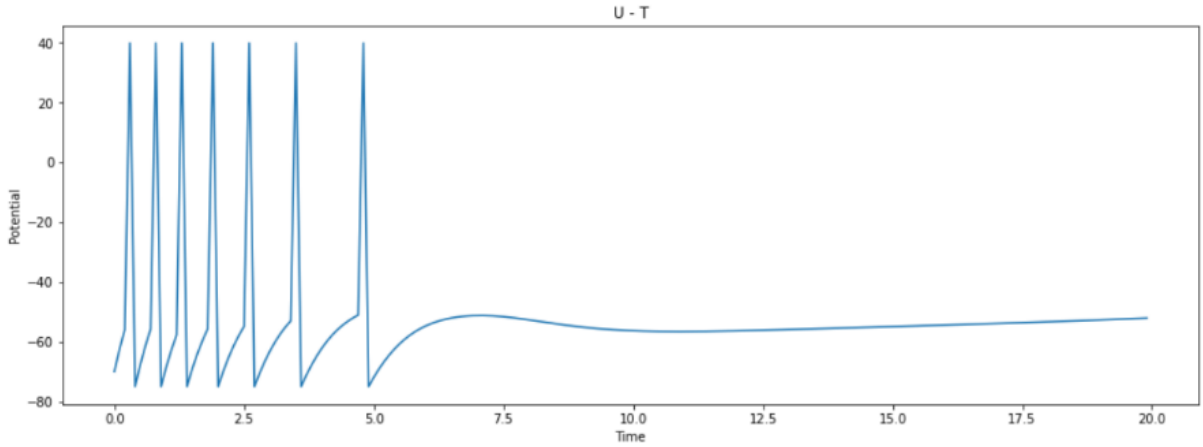
LIF:



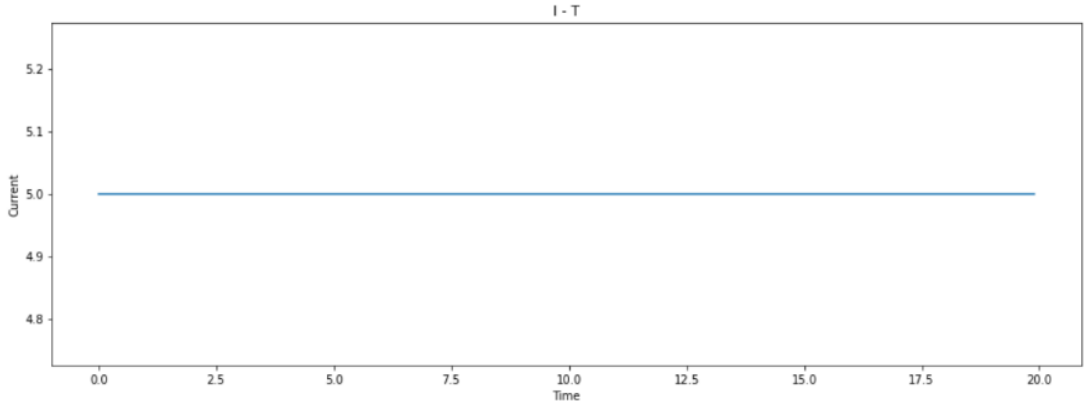
ALIF:



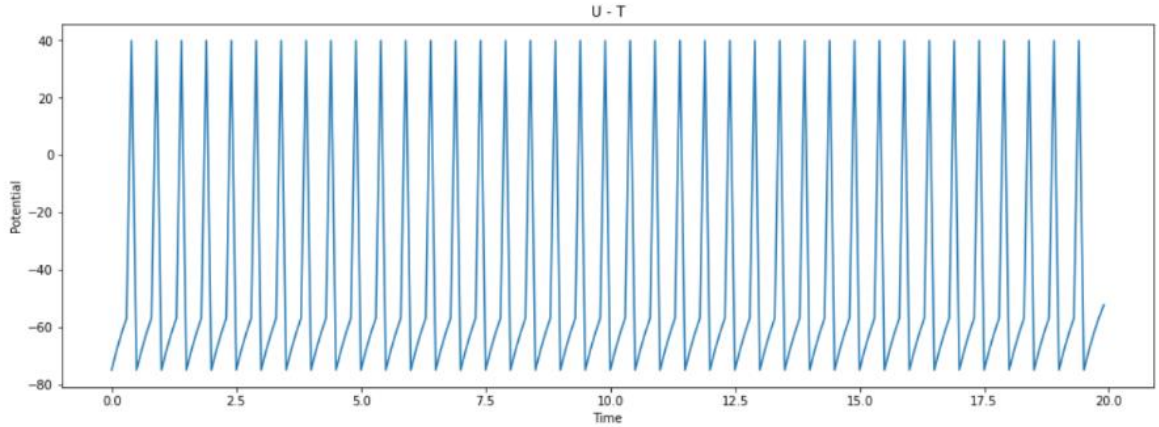
AELIF:



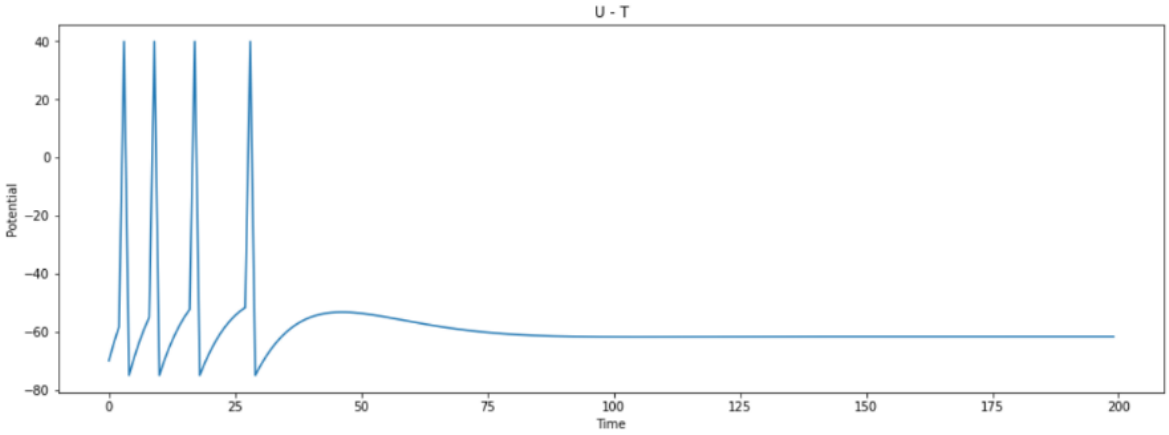
$I(t) = 5$


I - T
Current
Time
5.2
5.1
5.0
4.9
4.8
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0

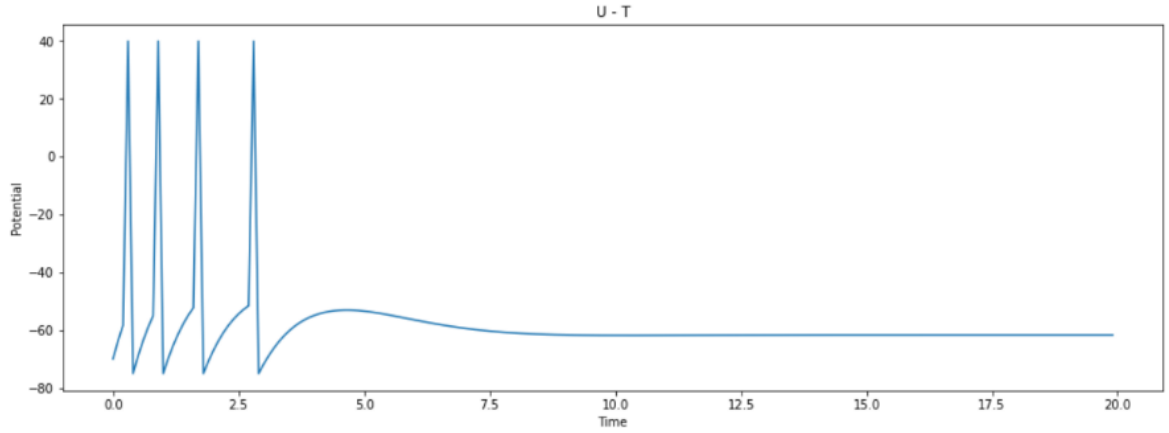
LIF:


U - T
Potential
Time
40
20
0
−20
−40
−60
−80
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0

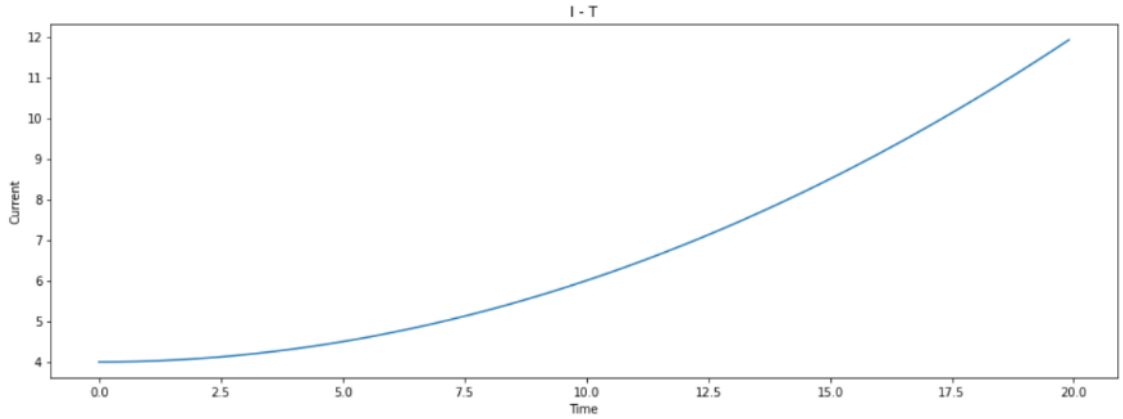
ALIF:


U - T
Potential
Time
40
20
0
−20
−40
−60
−80
0
25
50
75
100
125
150
175
200

AELIF:



$$I(t) = \frac{t^2}{5000} + 4$$



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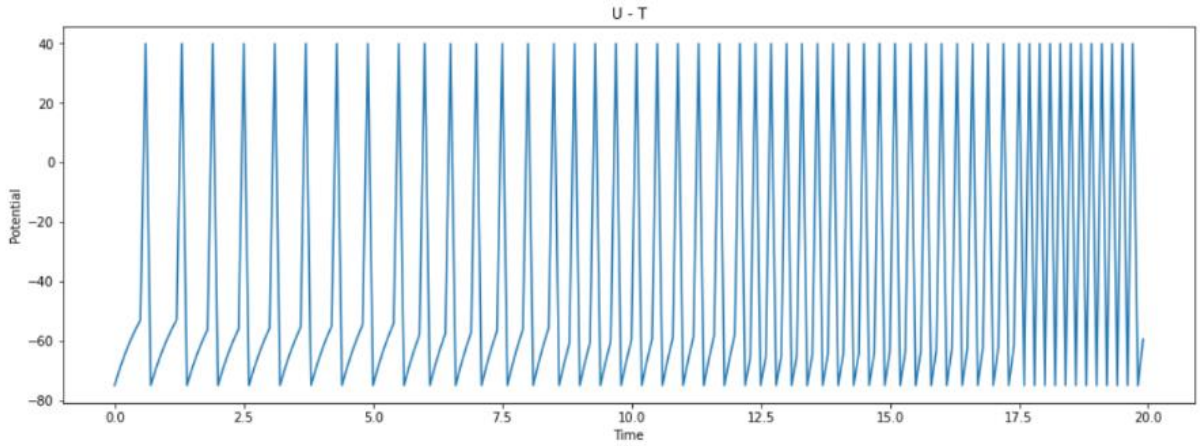

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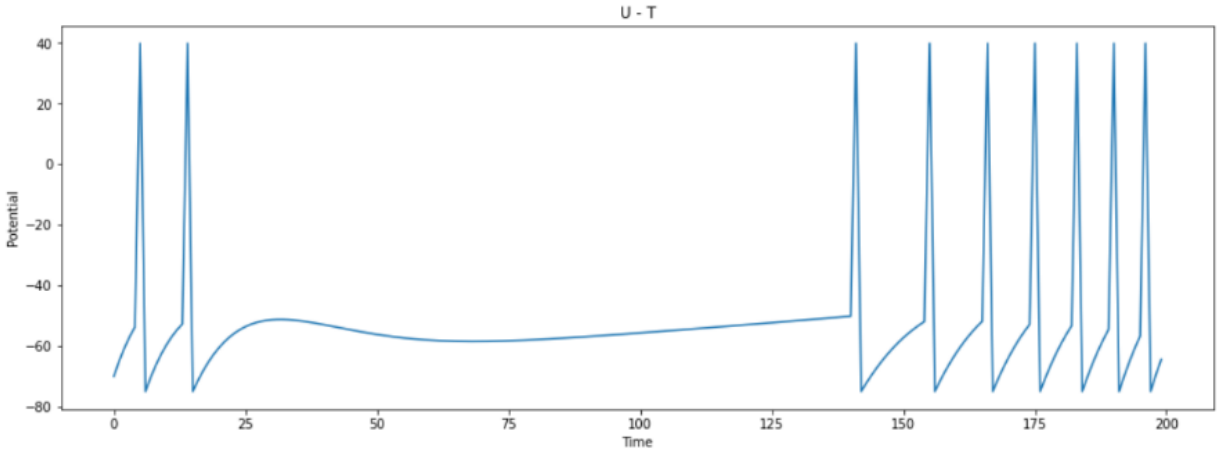
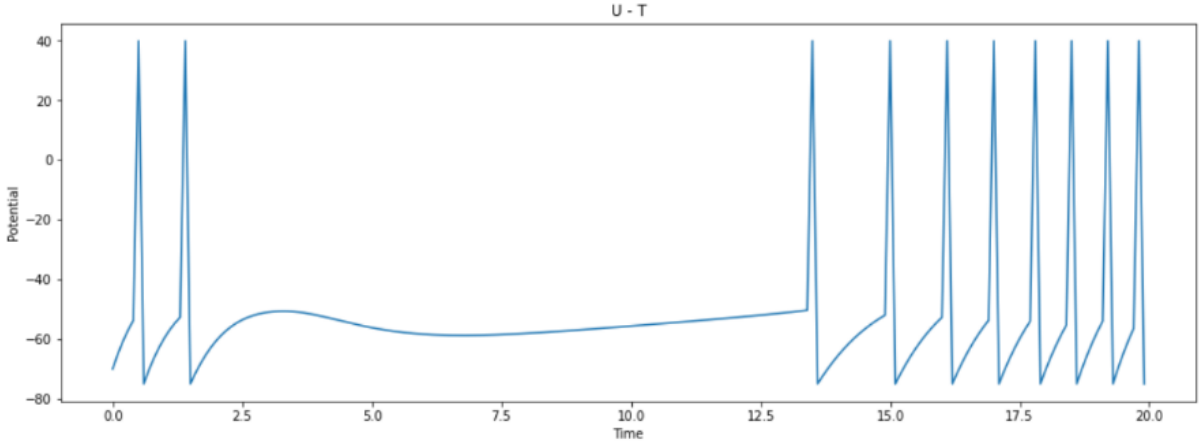
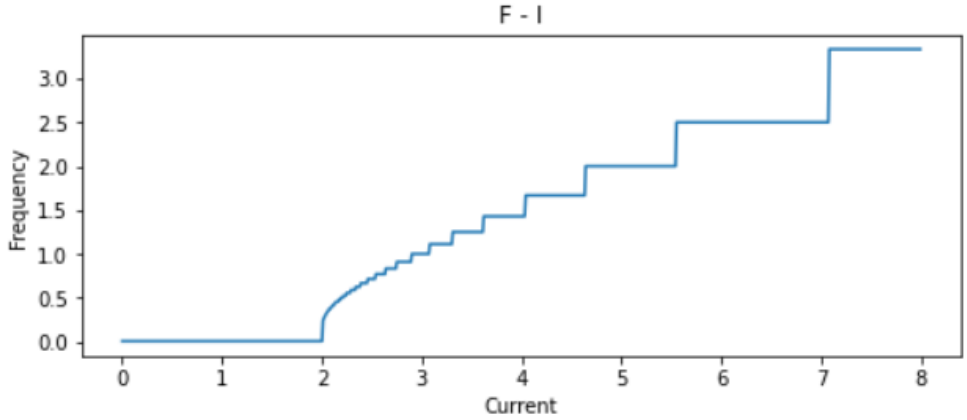


AELIF:

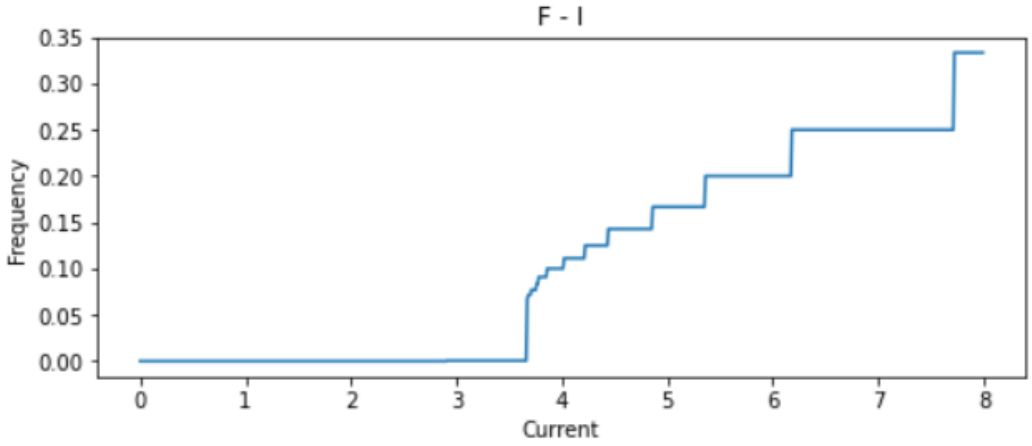


$F - I$ curve

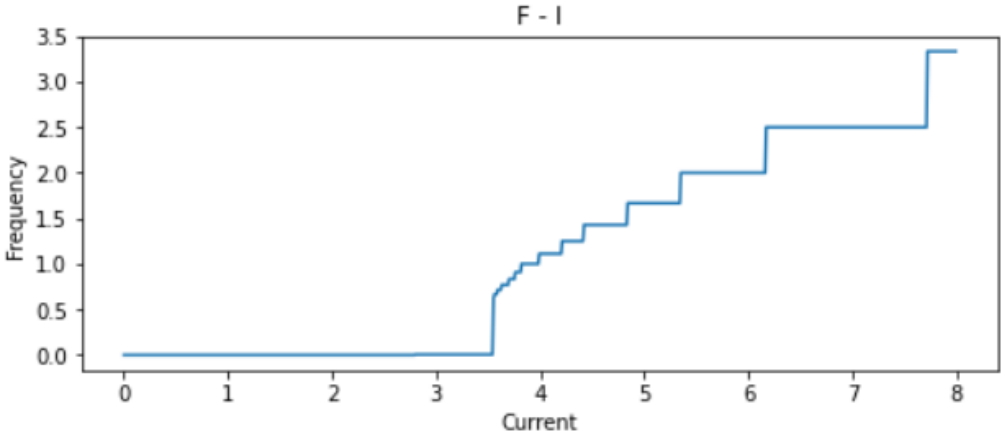
LIF:



ALIF:


F - I
Frequency
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
1
2
3
4
5
6
7
8
Current

AELIF:


F - I
Frequency
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
7
8
Current