MUNI
SCI

Jansen-Rit model

Vojtěch Janků

Jansen-Rit model

$$\dot{v}_0 = z_0,$$

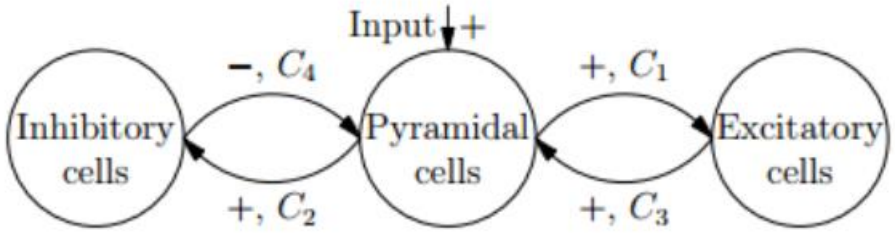
$$\dot{z}_0 = Aa\sigma(v_1 - v_2) - 2az_0 - a^2 v_0,$$

$$\dot{v}_1 = z_1,$$

$$\dot{z}_1 = Aa\left(I + C_2\sigma(C_1 v_0)\right) - 2az_1 - a^2 v_1,$$

$$\dot{v}_2 = z_2,$$

$$\dot{z}_2 = BbC_4\sigma(C_3 v_0) - 2bz_2 - b^2 v_2.$$



$$C_1 = C,$$
$$C_2 = 0.8C,$$
$$C_3 = 0.25C$$
$$C_4 = 0.25C$$

MUNI SCI

Hodnoty parametrů

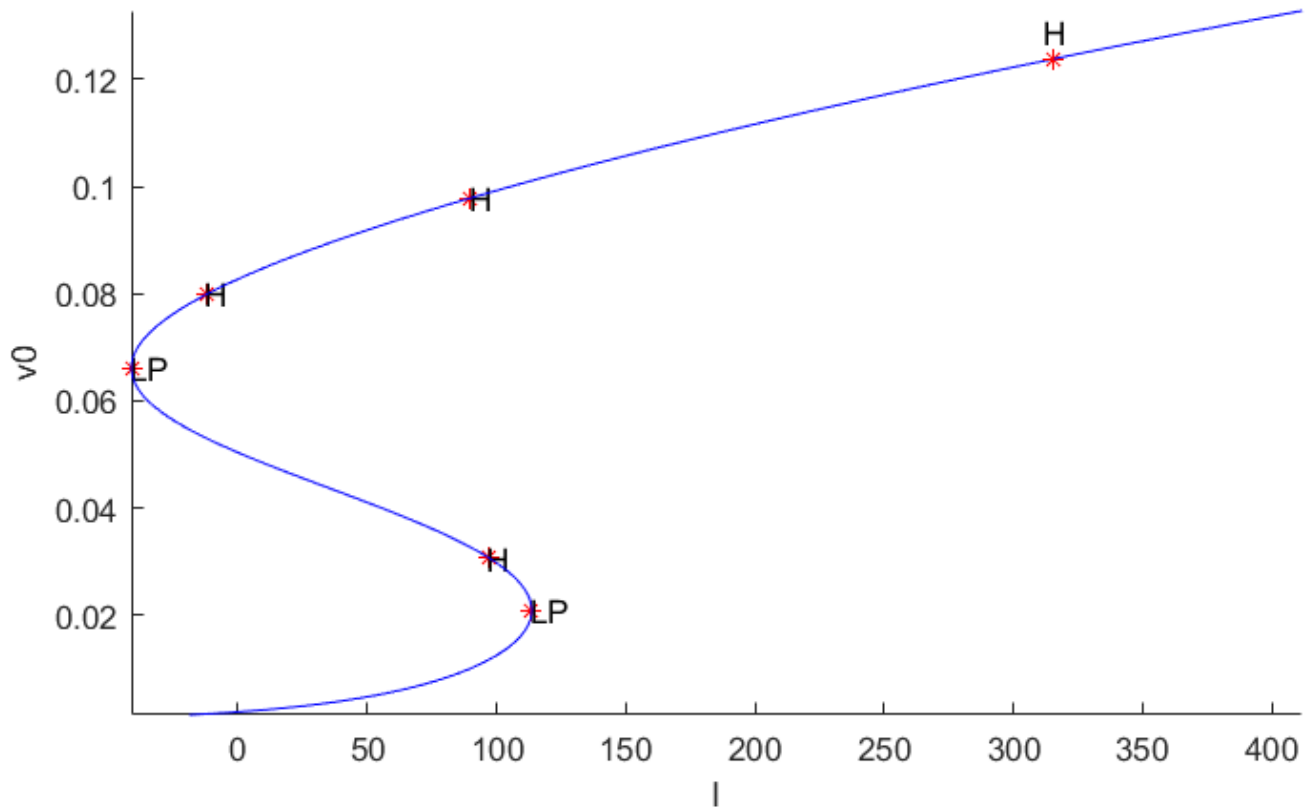
- Převzaté z původního článku:

Parameter	Interpretation	Value
A	Synaptic gain for the pyramidal and excitatory populations	3.25
a	Reciprocal of the time scale for the pyramidal and excitatory populations	100
B	Synaptic gain for the inhibitory population	22
b	Reciprocal of the time scale for the inhibitory population	50
C	Connectivity constant	135
v_0	Potential for which the sigmoid function has its median value	6
e_0	Half the difference between $\max_v(\sigma(v))$ and $\min_v(\sigma(v))$	2.5
r	Slope of sigmoid function	0.56

- Nastavené pevně, hýbeme jen s parametry C a I

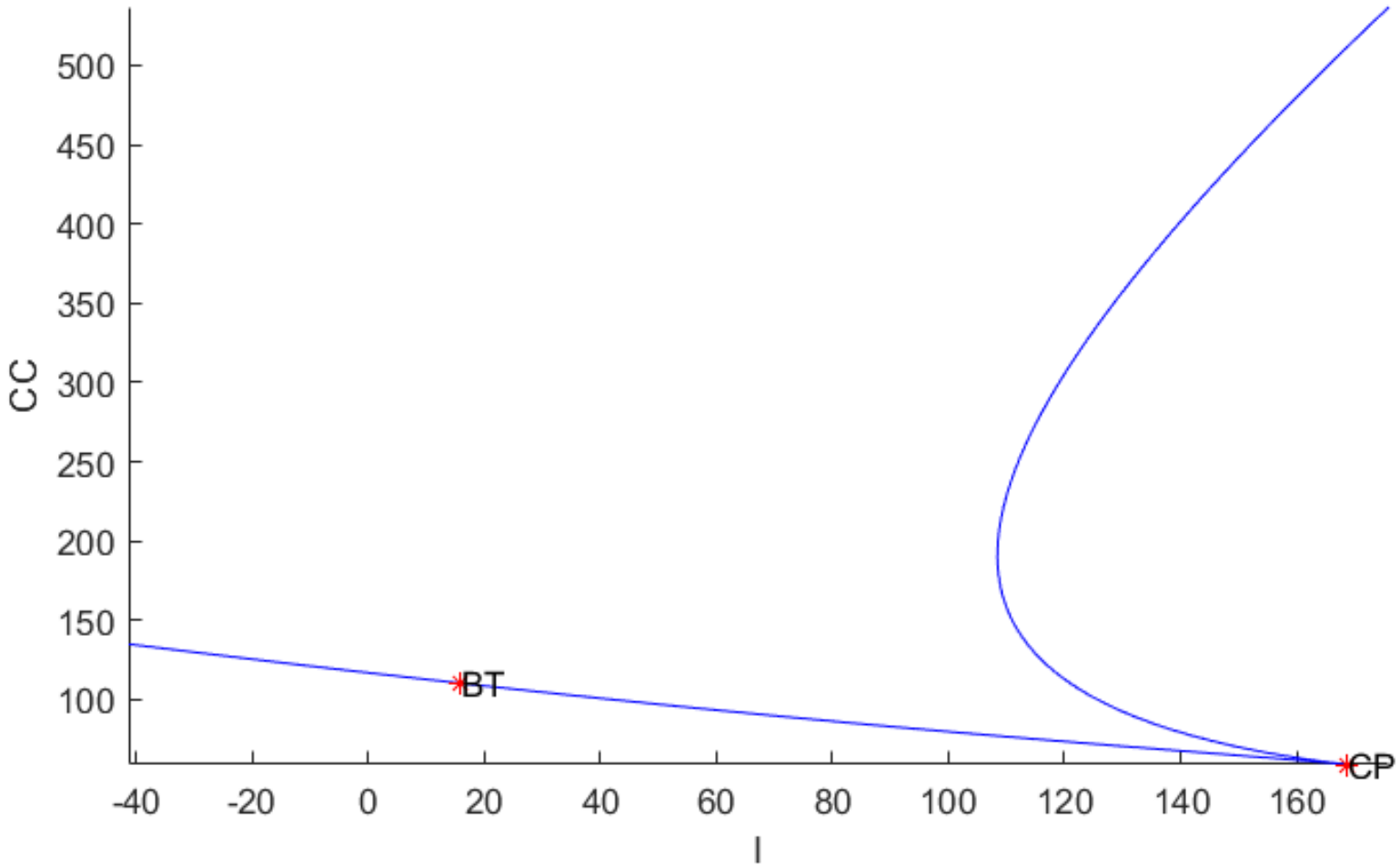
MUNI SCI

Kontinuace větve rovnováh podle parametru I, C=135



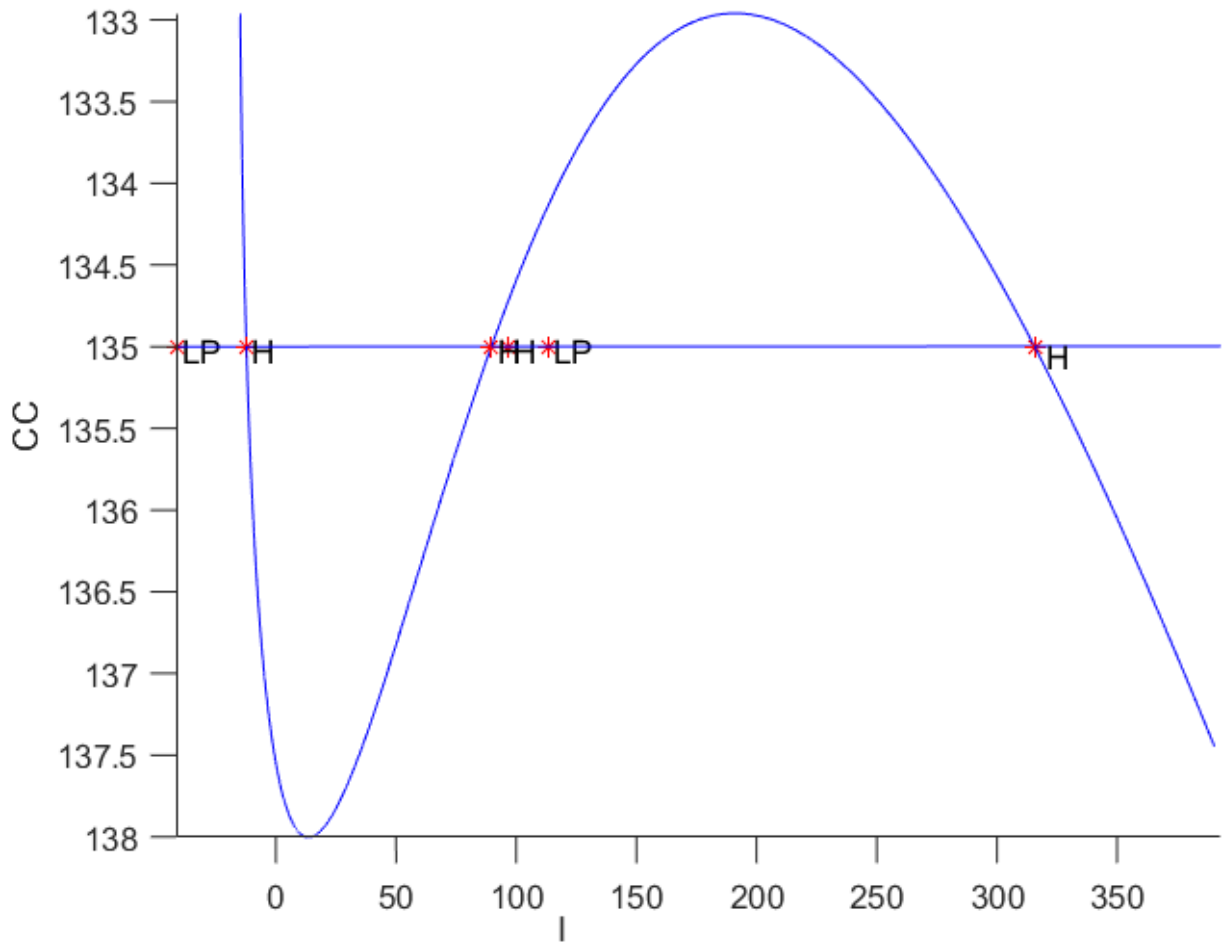
MUNI SCI

Varieta cusp bifurkace



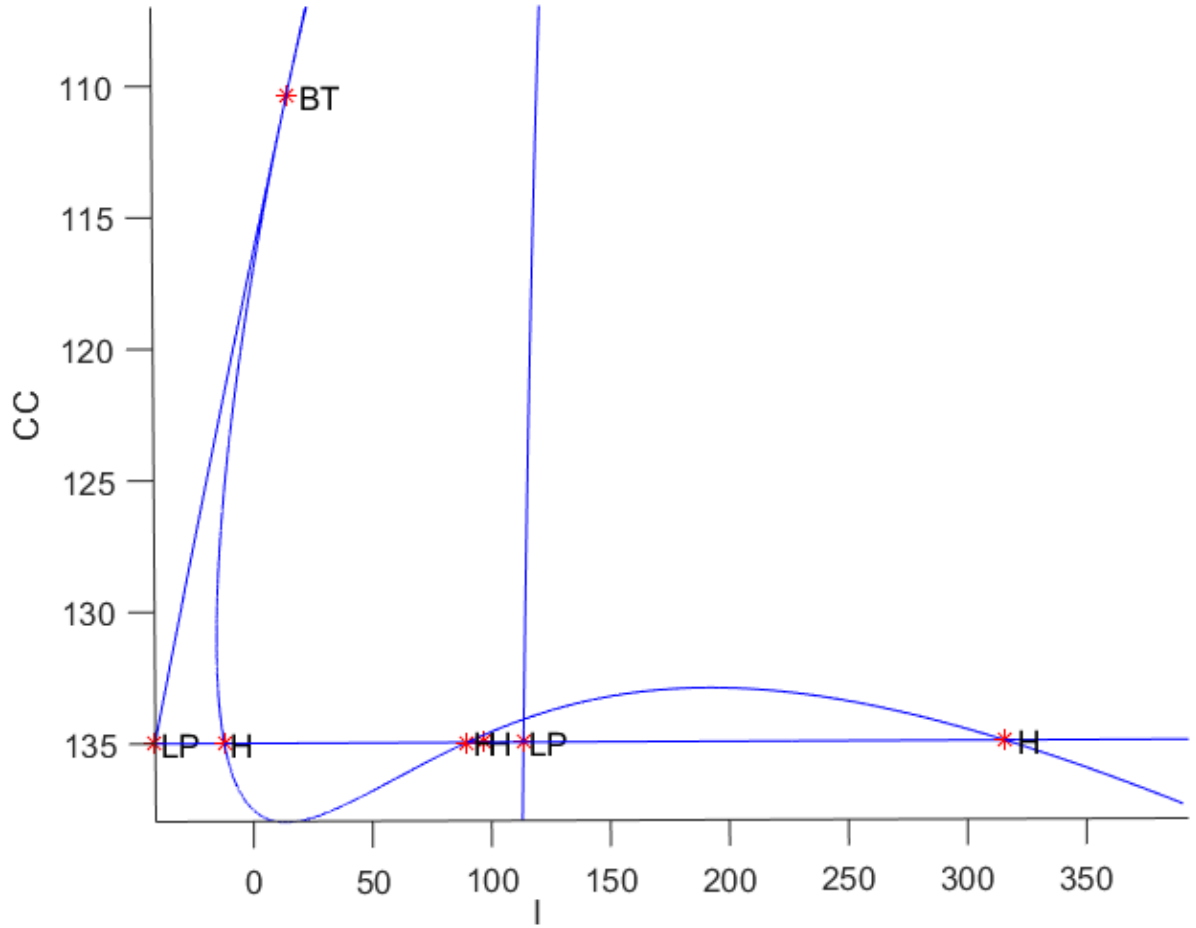
MUNI SCI

Kontinuace větve Hopfových bifurkací



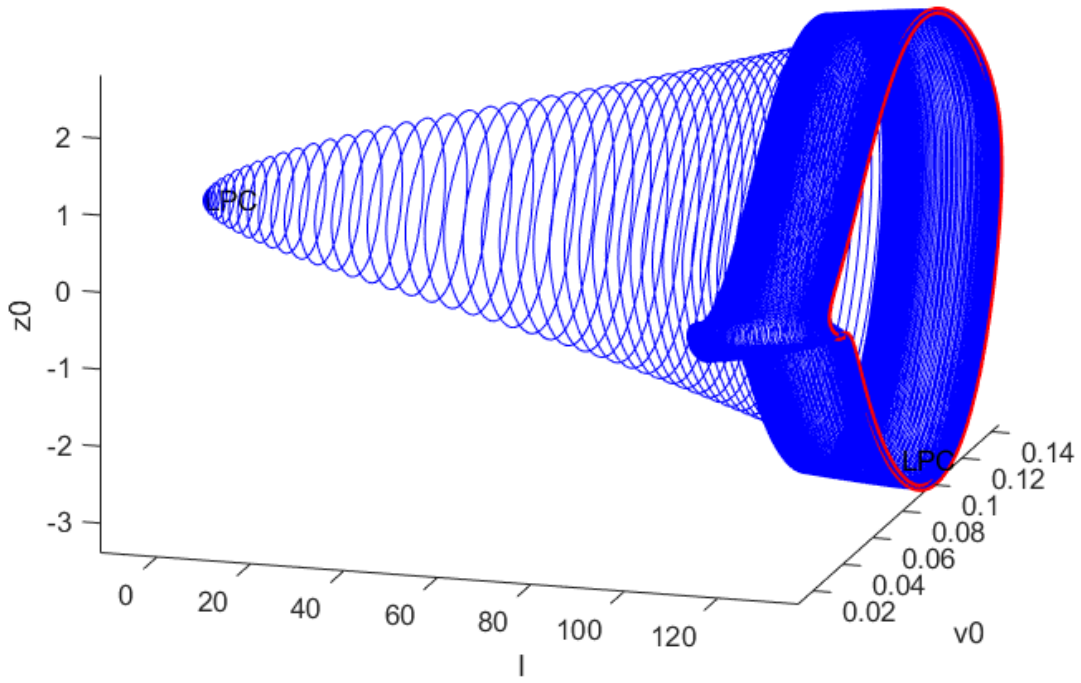
MUNI SCI

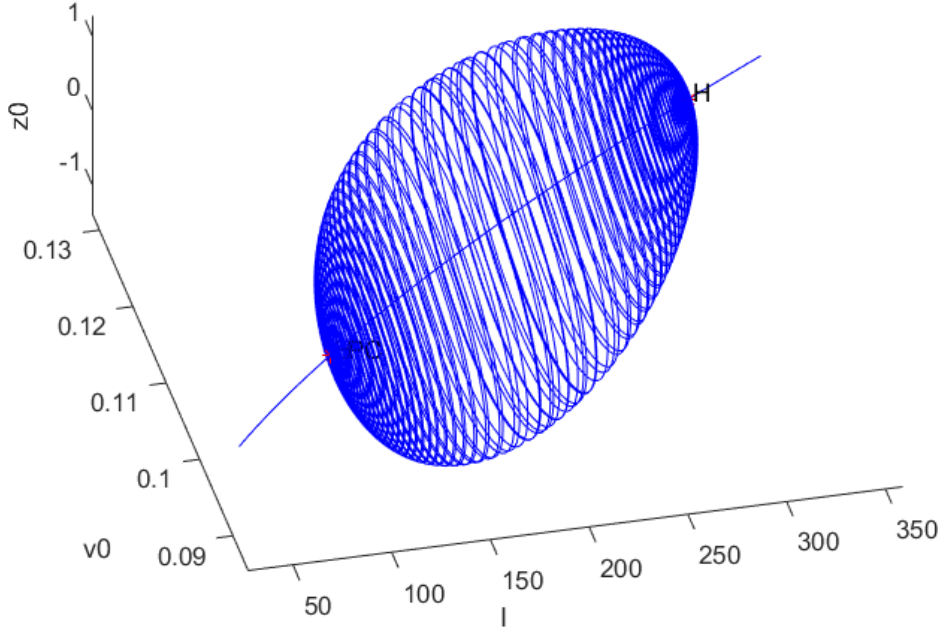
Kontinuace větve Hopfových bifurkací



MUNI SCI

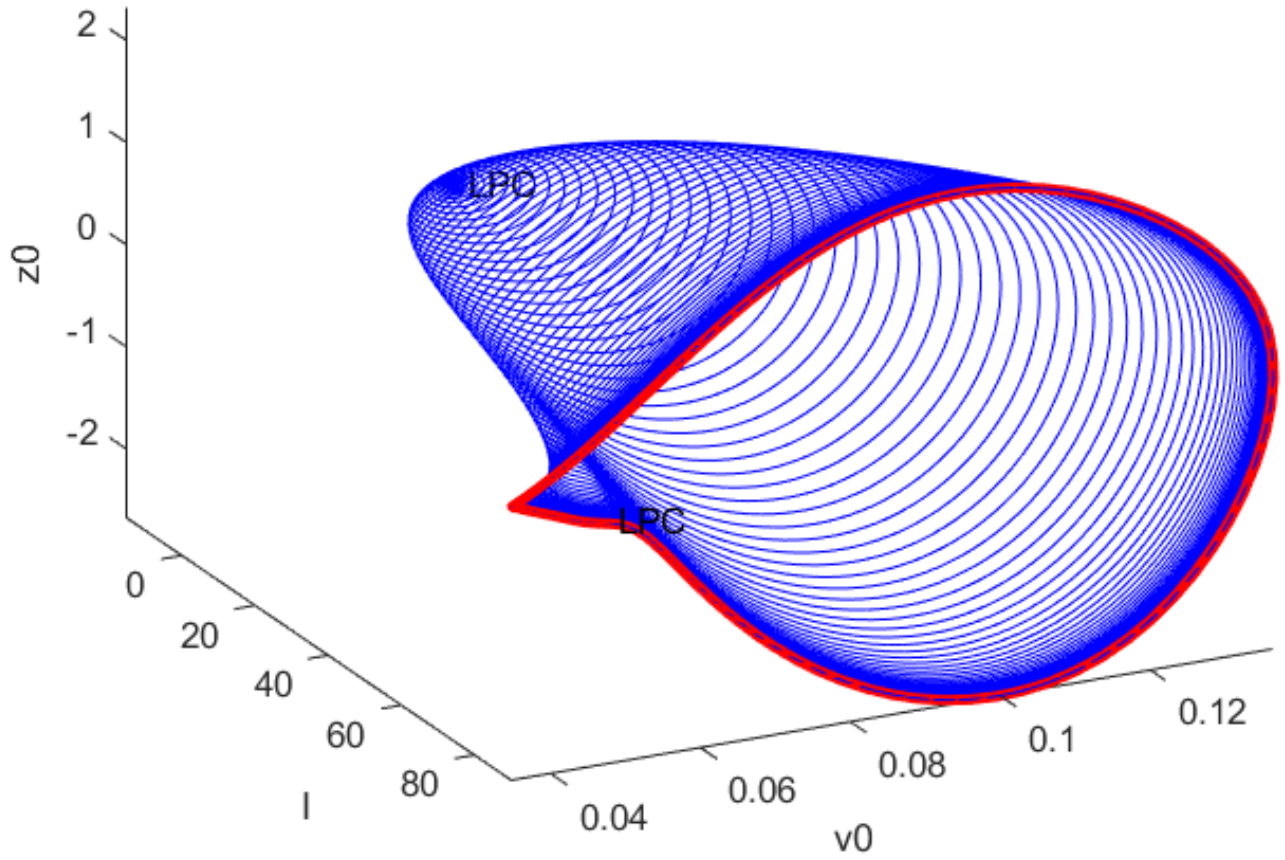
Kontinuace limitních cyklů, C=135





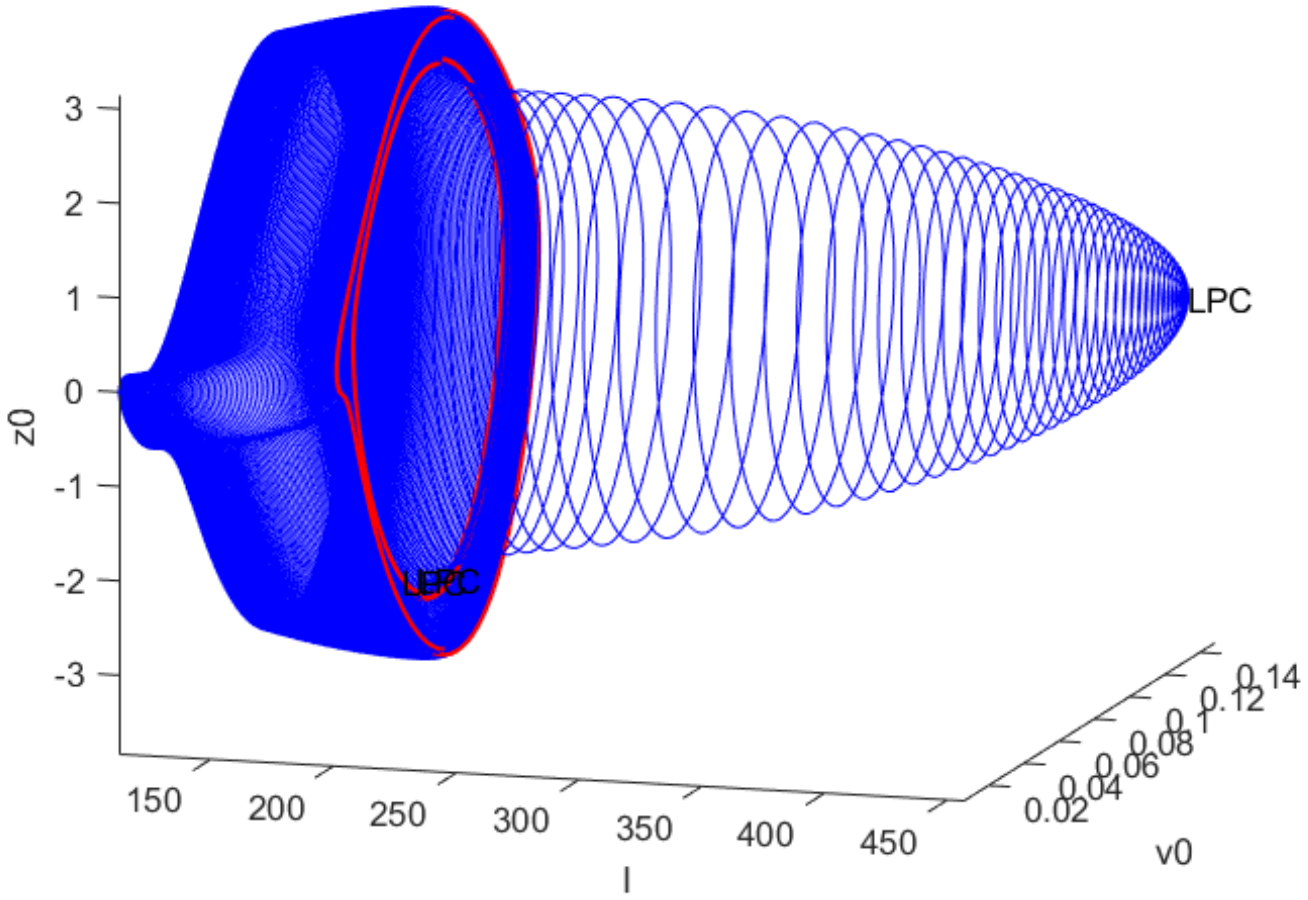
MUNI SCI

Kontinuace limitního cyklu, C=130



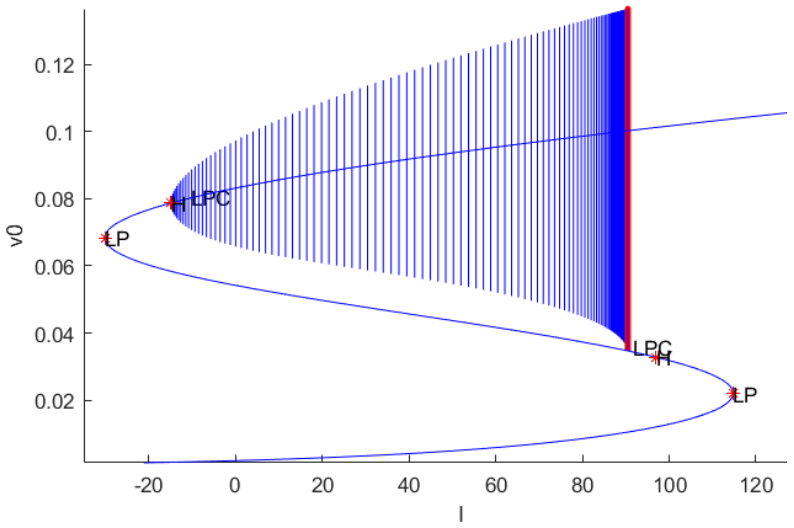
MUNI SCI

Kontinuace limitního cyklu, C=140

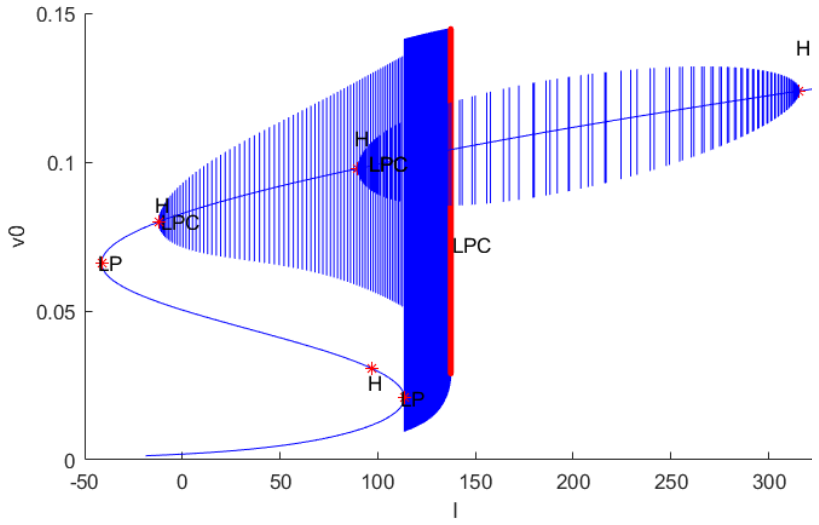


MUNI SCI

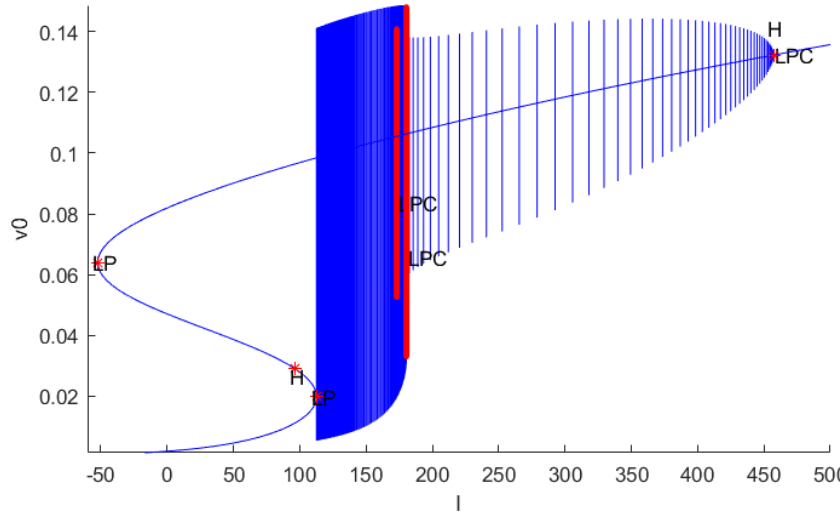
Profily rovnováh



C=130



C=135

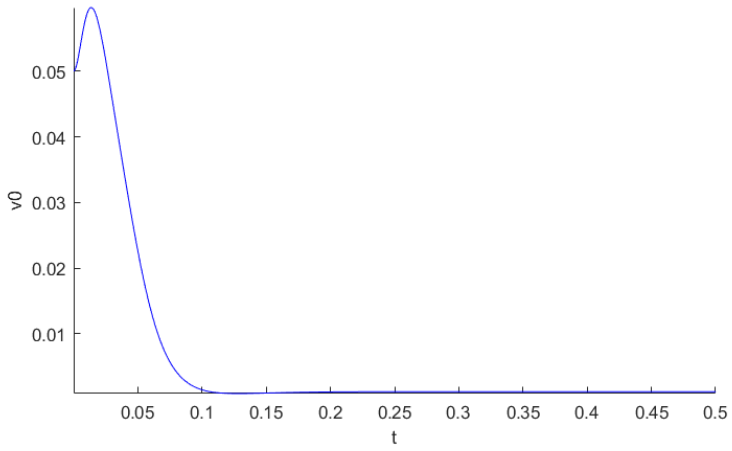


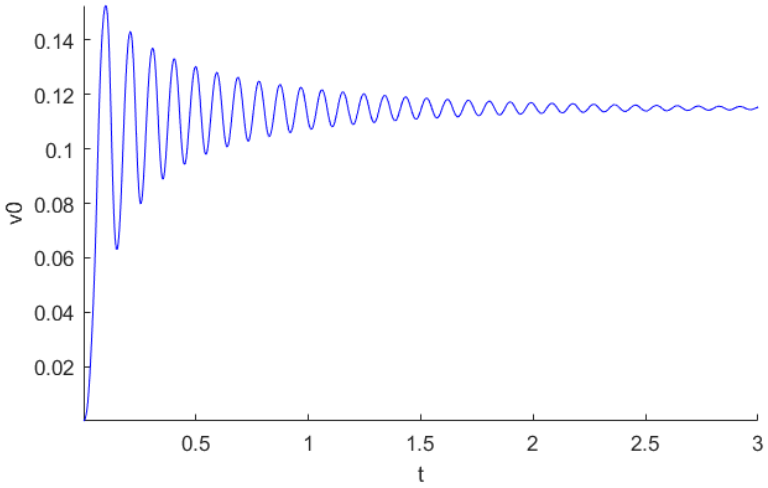
C=140

MUNI SCI

Dynamika při C=130

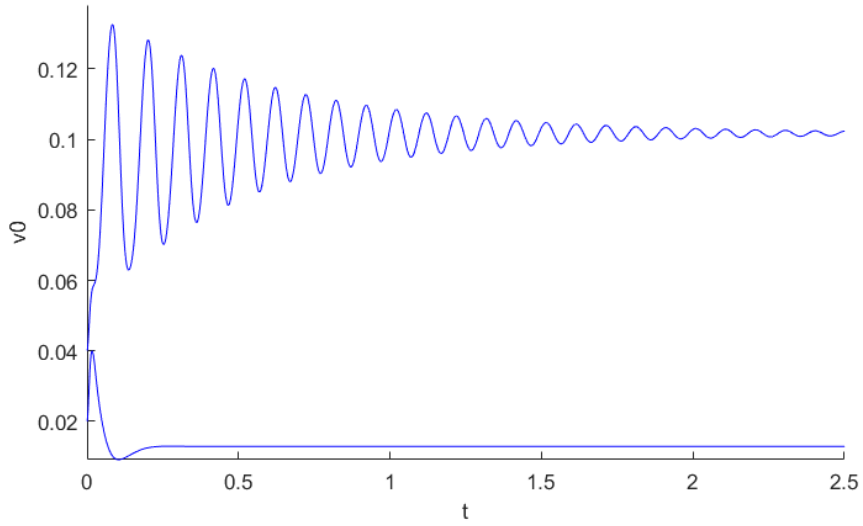
I = -30

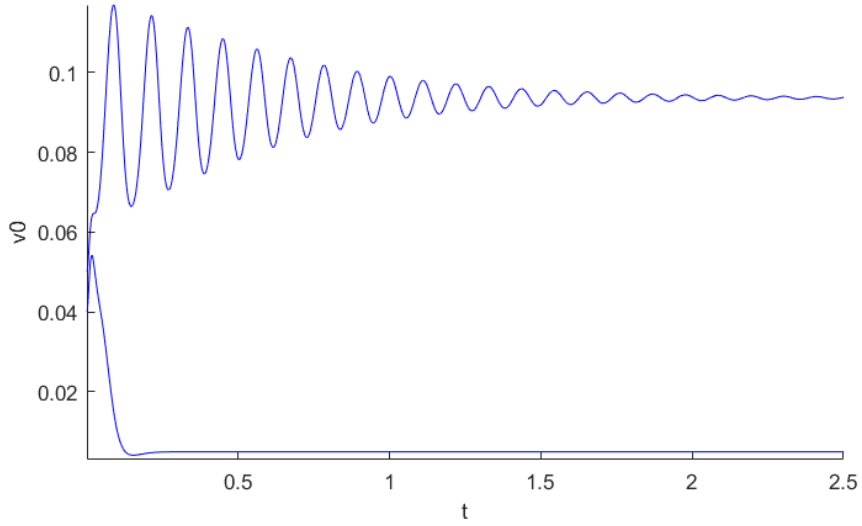




I = 200

I = 50



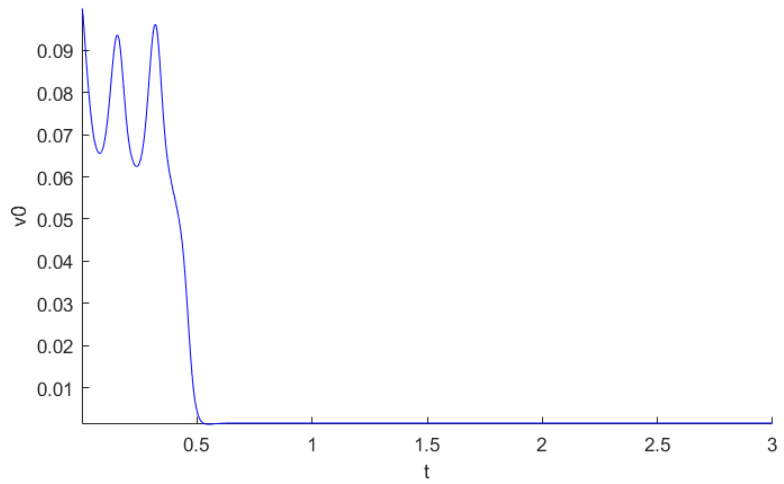


I = 100

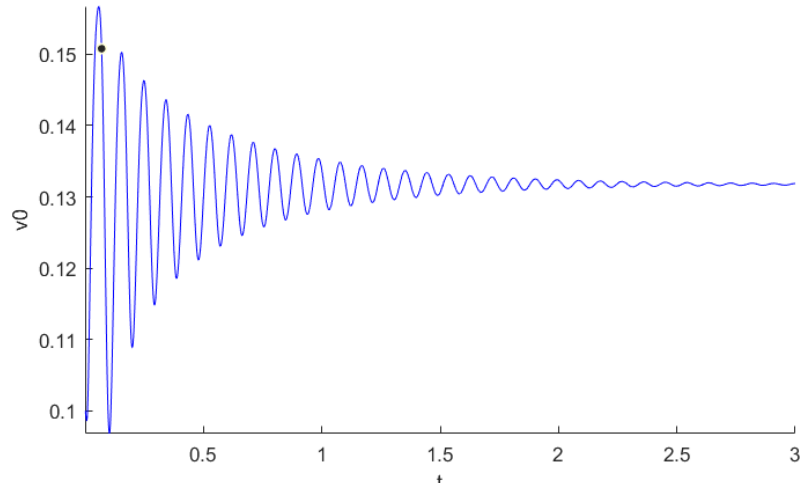
MUNI SCI

Dynamika při C=135

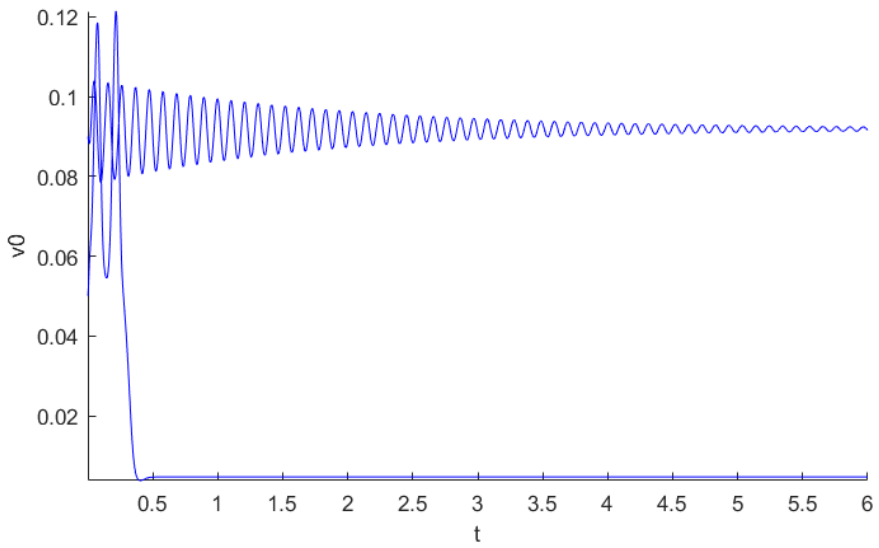
I = -10



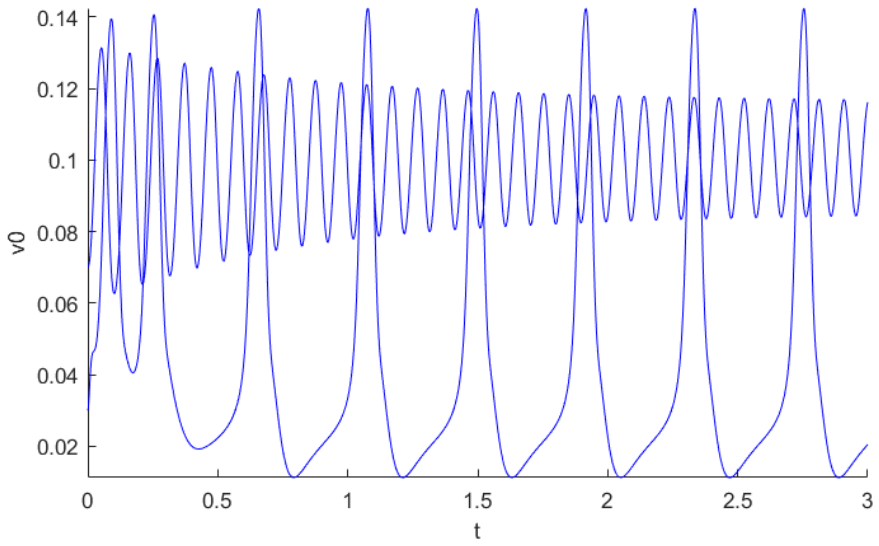
I = 400



I = 50

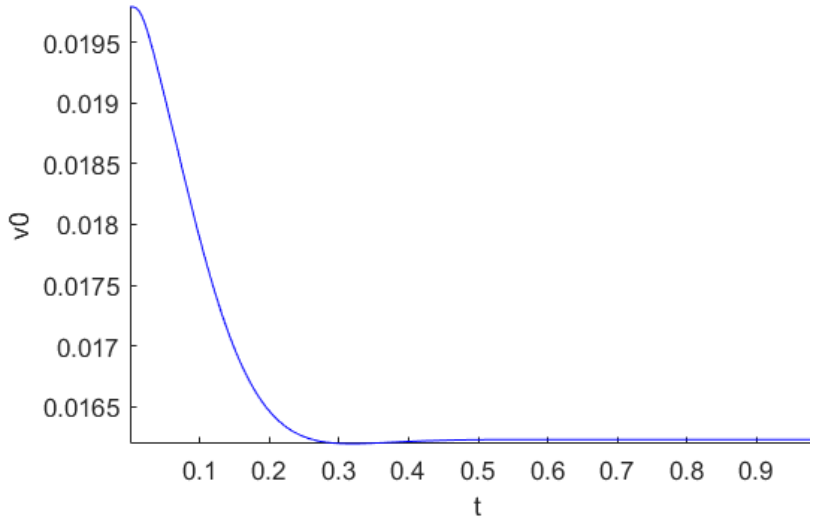


I = 120

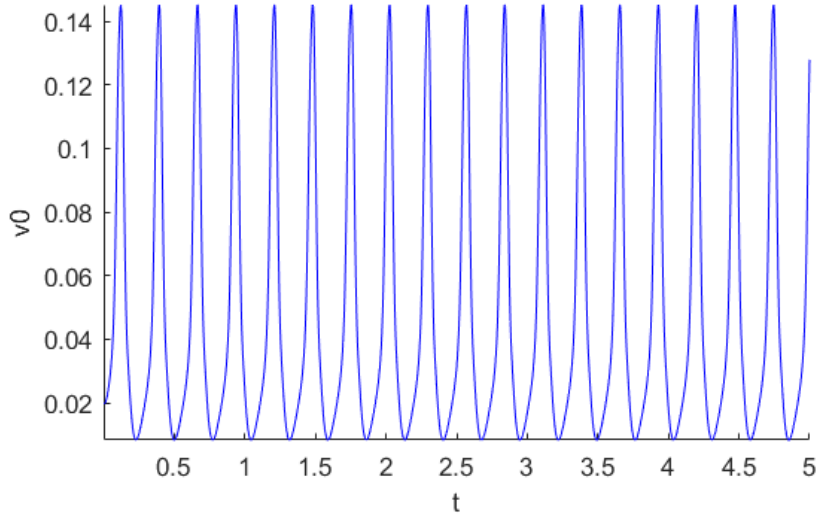


MUNI SCI

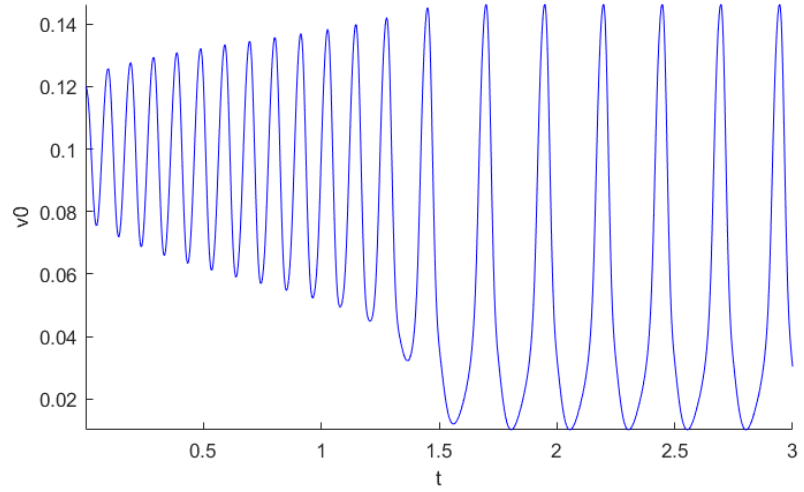
Dynamika při C=140



I=110



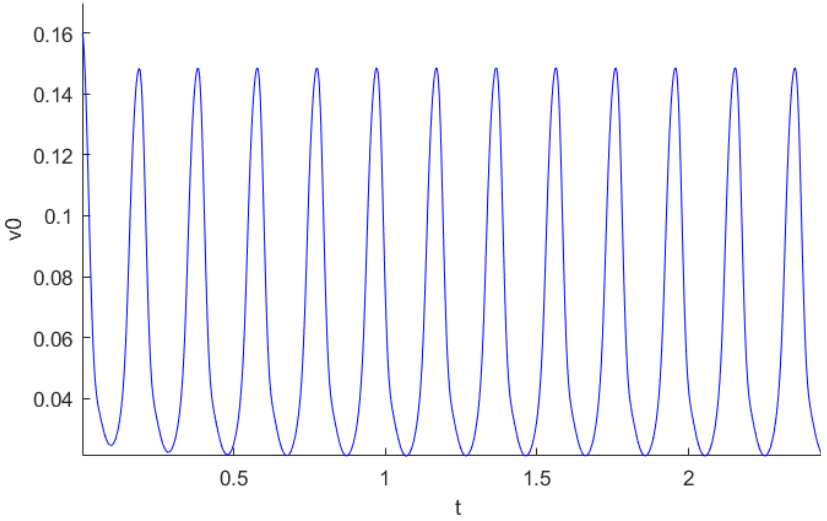
I=140



I=150

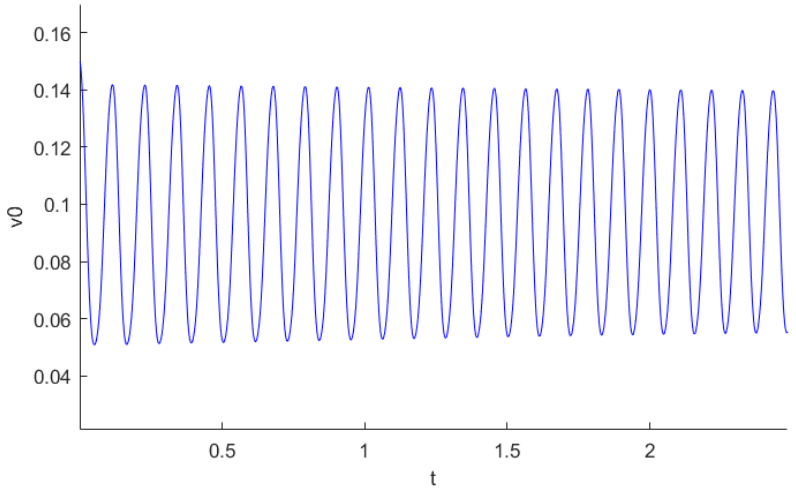
MUNI SCI

Dynamika při C=140



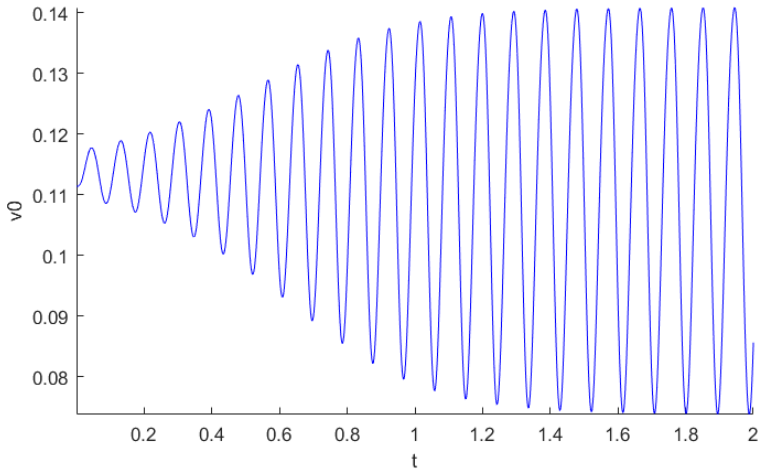
I=175,

blízko vnějšího cyklu



I=175,

blízko vnitřního cyklu



I=250

MUNI SCI

Zdroje

- http://essay.utwente.nl/88502/1/Jansen%20Klomp_MA_EEMCS.pdf
- https://wwwhome.ewi.utwente.nl/~meijerhge/MT_JR_slow.pdf

MUNI SCI