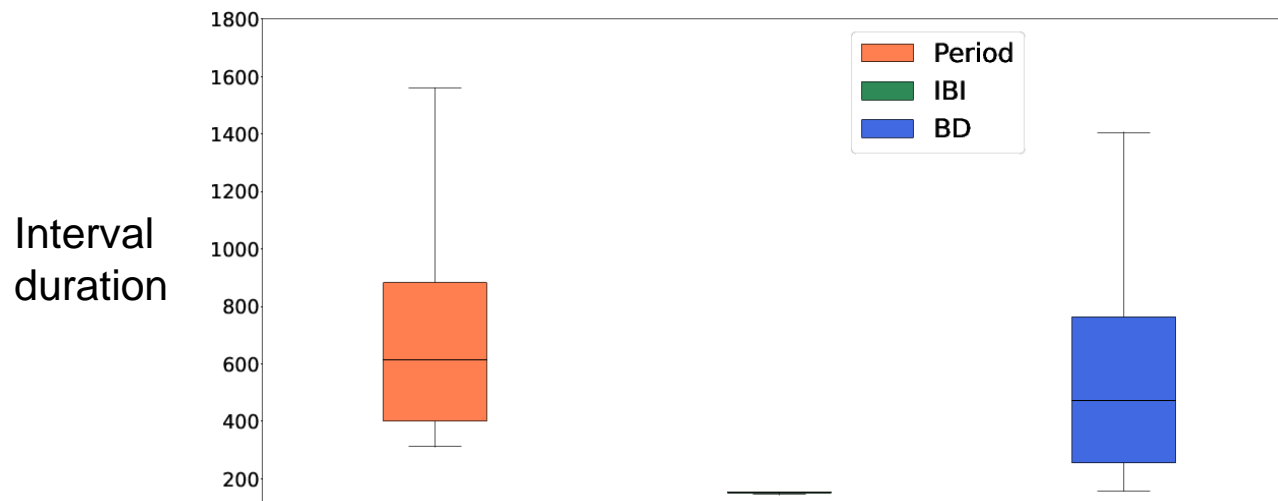
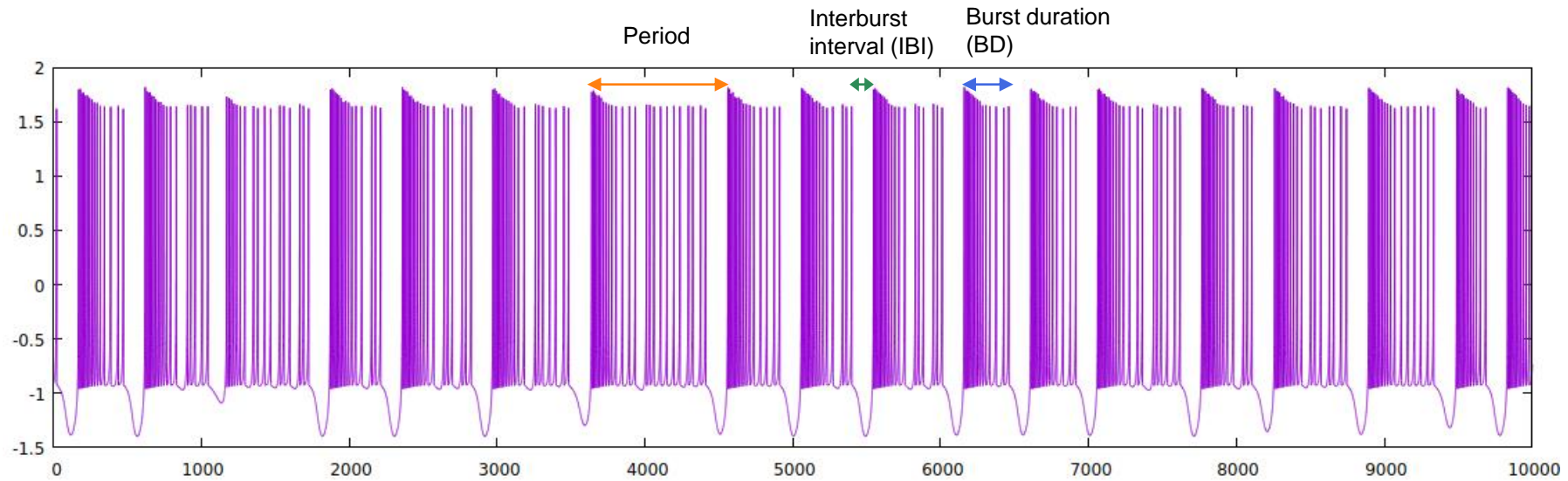


# Hindmarsh-Rose model (original)



$$\frac{dx(t)}{dt} = y(t) + 3x^2(t) - x^3(t) - z(t) + e$$

$$\frac{dy(t)}{dt} = 1 - 5x^2(t) - y(t)$$

$$\frac{1}{\mu} \frac{dz(t)}{dt} = -z(t) + S[x(t) + 1.6]$$

$$e = 3.281, \mu = 0.0021, S = 4.0 \rightarrow \text{chaotic}$$

$$e = 3.0, \mu = 0.0021, S = 4.0 \rightarrow \text{regular}$$

# Hindmarsh-Rose model (modified)

$$\frac{dx(t)}{dt} = y(t) + 3x^2(t) - x^3(t) - z(t) + e$$

$$\frac{dy(t)}{dt} = 1 - 5x^2(t) - y(t)$$

$$\frac{1}{\mu} \frac{dz(t)}{dt} = -vz(t) + S[x(t) + 1.6]$$

$$v = 0.1$$

$$e = 3.281, \mu = 0.0021, S = 1.0$$