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bursting

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Synonym	burst

In neuroscience, **bursting** denotes two or more action potentials (spikes) fired by a neuron, followed by a period of quiescence. A burst of two spikes is called a **doublet**, three spikes - **triplet**, four - **quadruplet**, etc.

Most mathematical models of bursting can be written in the singularly perturbed form

$$\begin{aligned}\dot{x} &= f(x, y) && \text{(fast spiking)} \\ \dot{y} &= \mu g(x, y) && \text{(slow modulation)}\end{aligned}$$

where  $x \in \mathbb{R}^n$  is the fast variable that simulates fast spiking of the neuron, and  $y \in \mathbb{R}^m$  is the slow variable that modulates such spiking activity.

A topological classification of bursters relies on the bifurcations of the fast subsystem (variable  $x$ ) when the slow subsystem (variable  $y$ ) is treated as a parameter.

## References

- [iz] Izhikevich E.M. (2007) Dynamical Systems in Neuroscience: The Geometry of Excitability and Bursting. The MIT Press.
- [izb] Eugene M. Izhikevich (2006) Bursting. Scholarpedia, p.1401 (available online at <http://www.scholarpedia.org/article/Bursting>).