

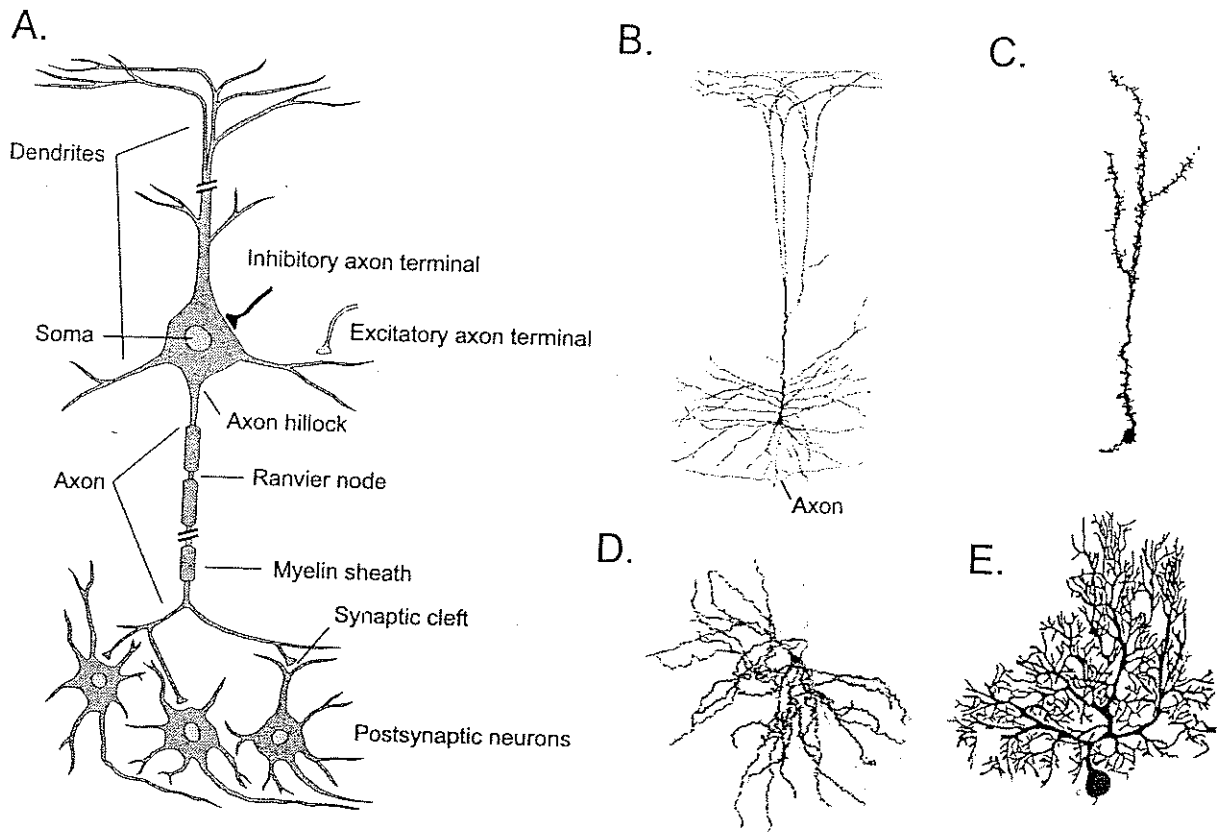
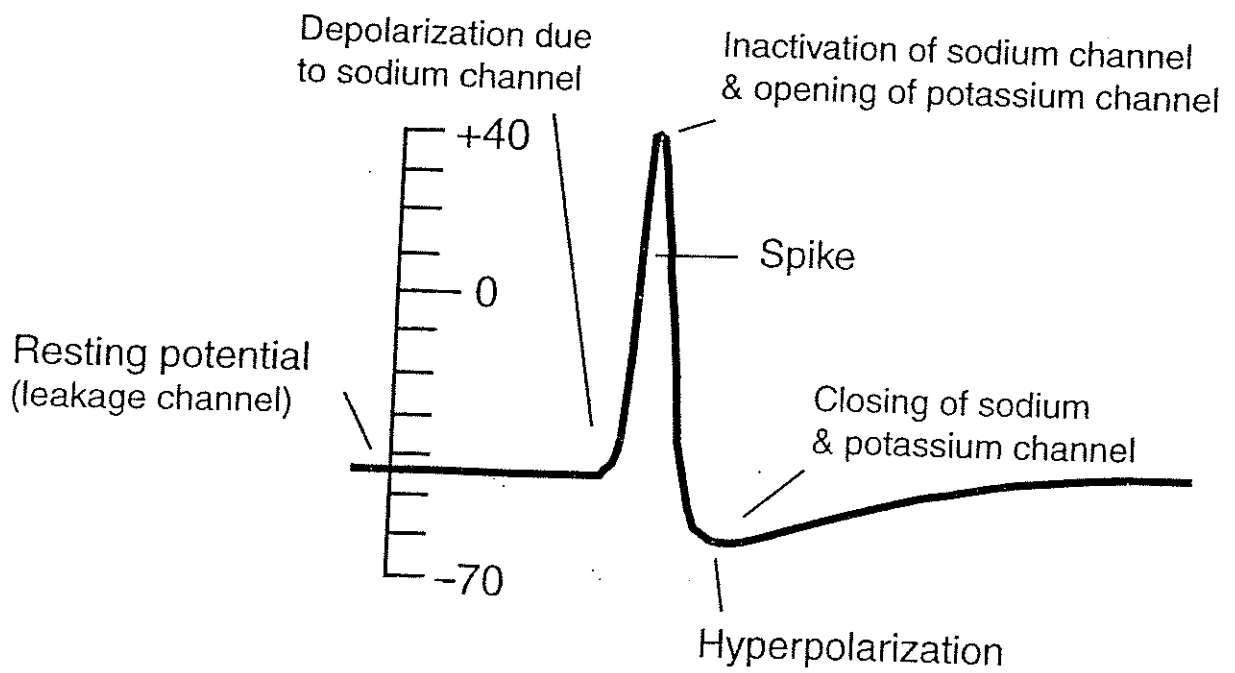


Fig. 2.1 (A) Schematic neuron that is similar in appearance to pyramidal cells in the neocortex. The components outlined in the drawing are, however, typical for most major neuron types [adapted from Kandel, Schwartz, and Jessell, *Principles of neural science*, McGraw-Hill, 4th edition (2000)]. (B–E) Examples of morphologies of different neurons. (B) Pyramidal cell from the motor cortex [from Cajal, *Histologie du système nerveux de l'homme et des vertèbres*, Maloin, Paris (1911)], (C) Granule neuron from olfactory bulb of mouse [from Greer, *J. Comp. Neurol.* 257: 442–52 (1987)], (D) Spiny neuron from the caudate nucleus [from Kitai, in *GABA and the basal ganglia*, Chiara & Gessa (eds), Raven Press (1981)], (E) Golgi-stained Purkinje cell from the cerebellum [from Bradley, Berry, *Brain Res.* 109: 133–51 (1976)].



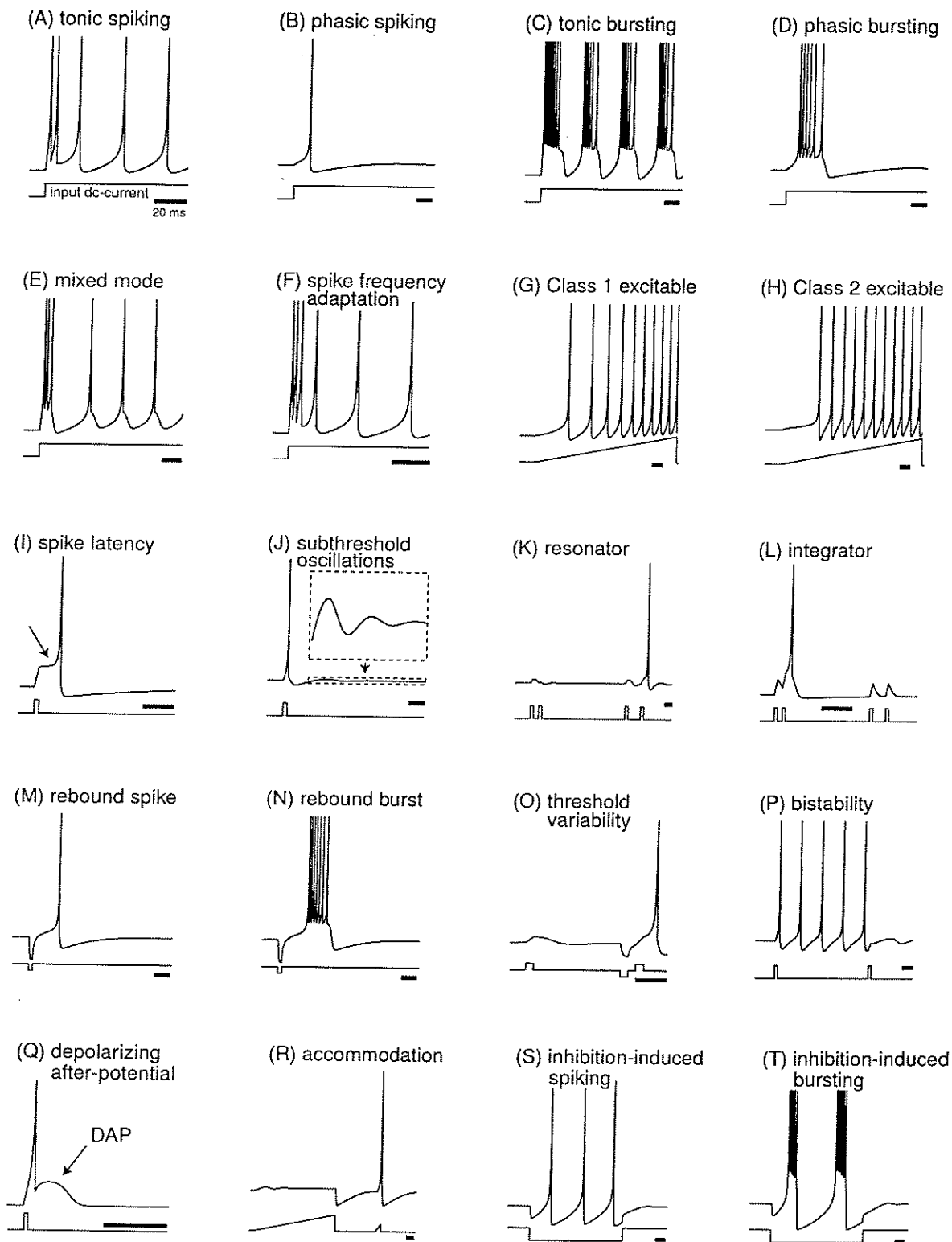
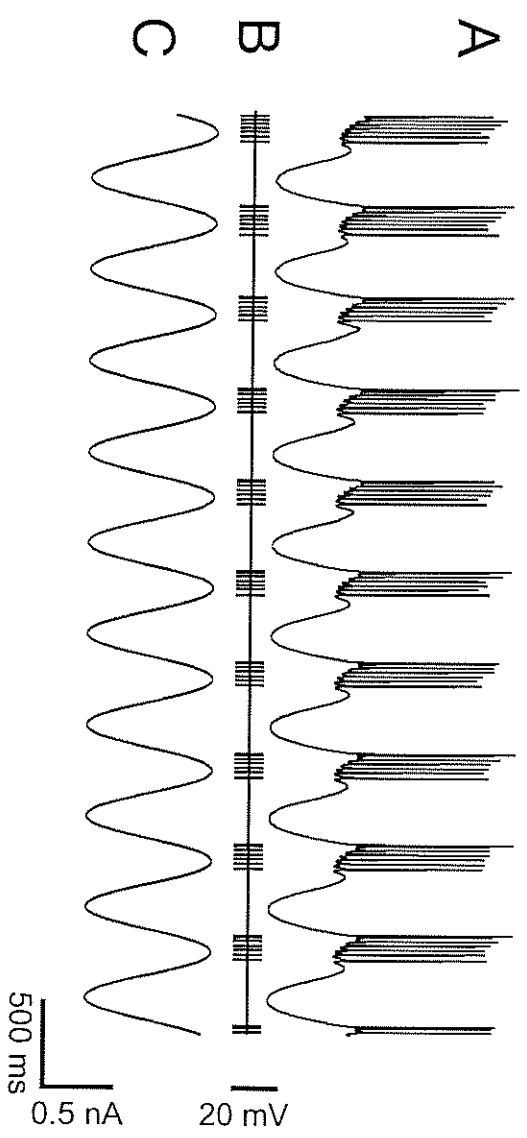
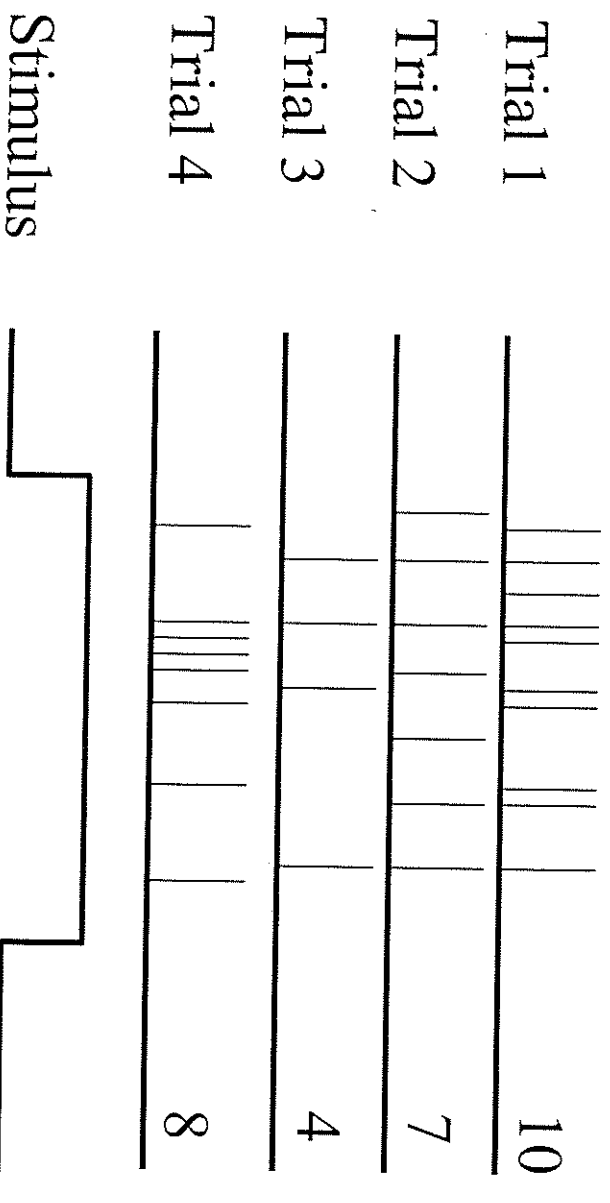
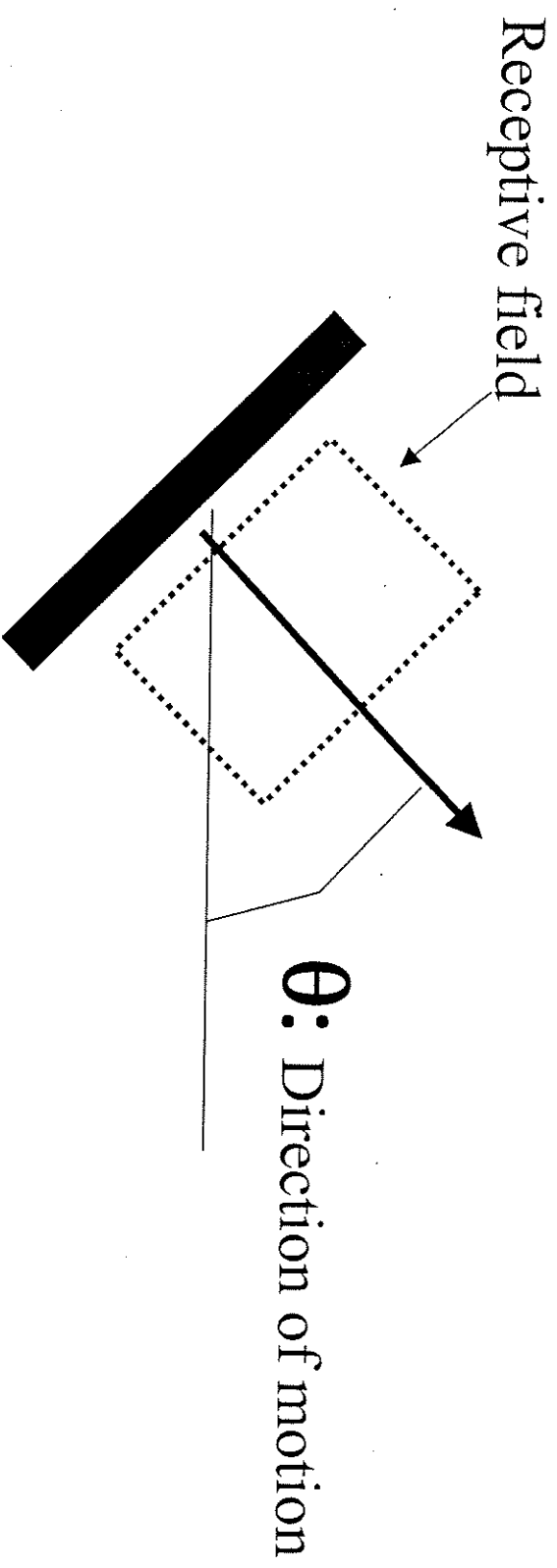


Fig. 1. Summary of the neuro-computational properties of biological spiking neurons. Shown are simulations of the same model, Eq. (1, 2), with different choices of parameters. Each horizontal bar denotes 20 ms time interval. The MATLAB file generating the figure and containing all the parameters can be downloaded from the author's website. This figure is reproduced with permission from www.izhikevich.com. (Electronic version of the figure and reproduction permissions are freely available at www.izhikevich.com).



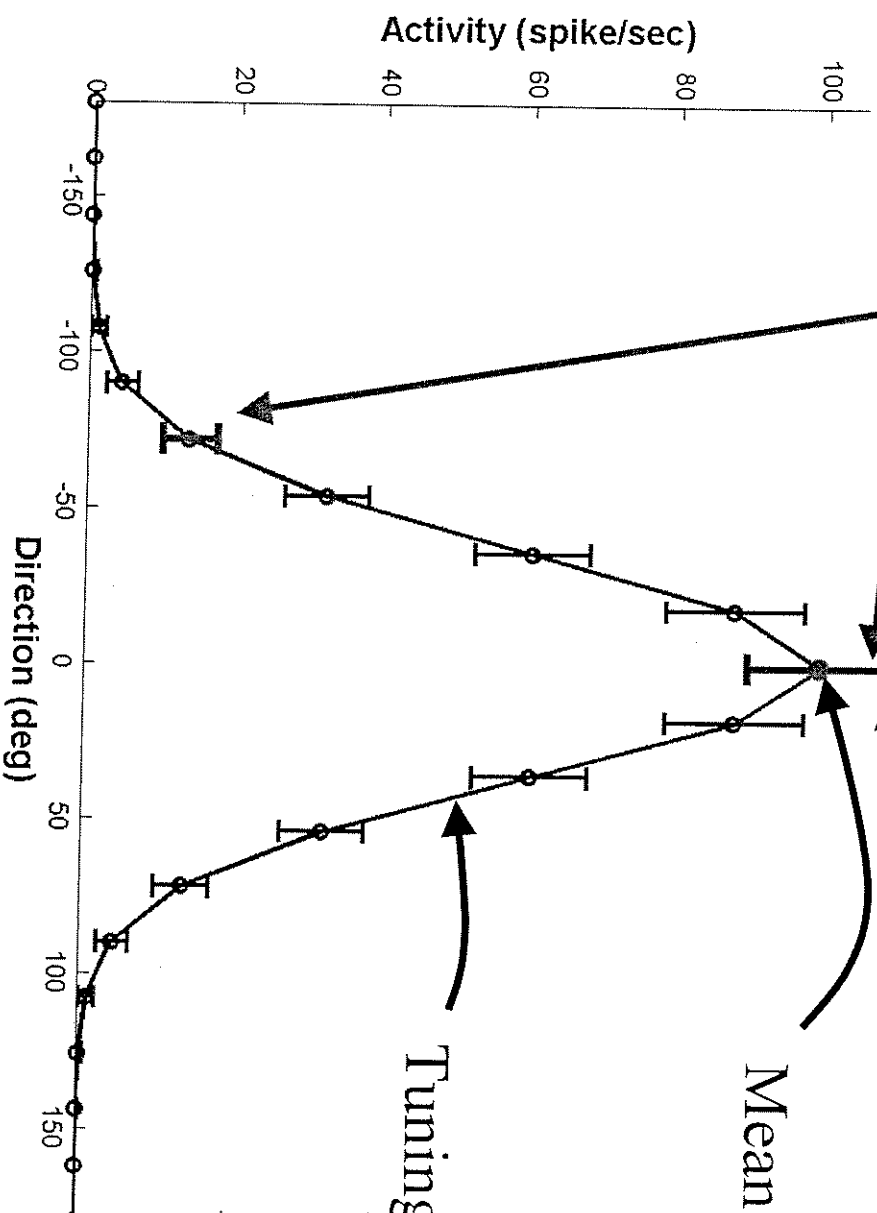


Variance, $\sigma_i(\theta)^2$, can depend on the input

Variance of the noise, $\sigma_i(0)^2$

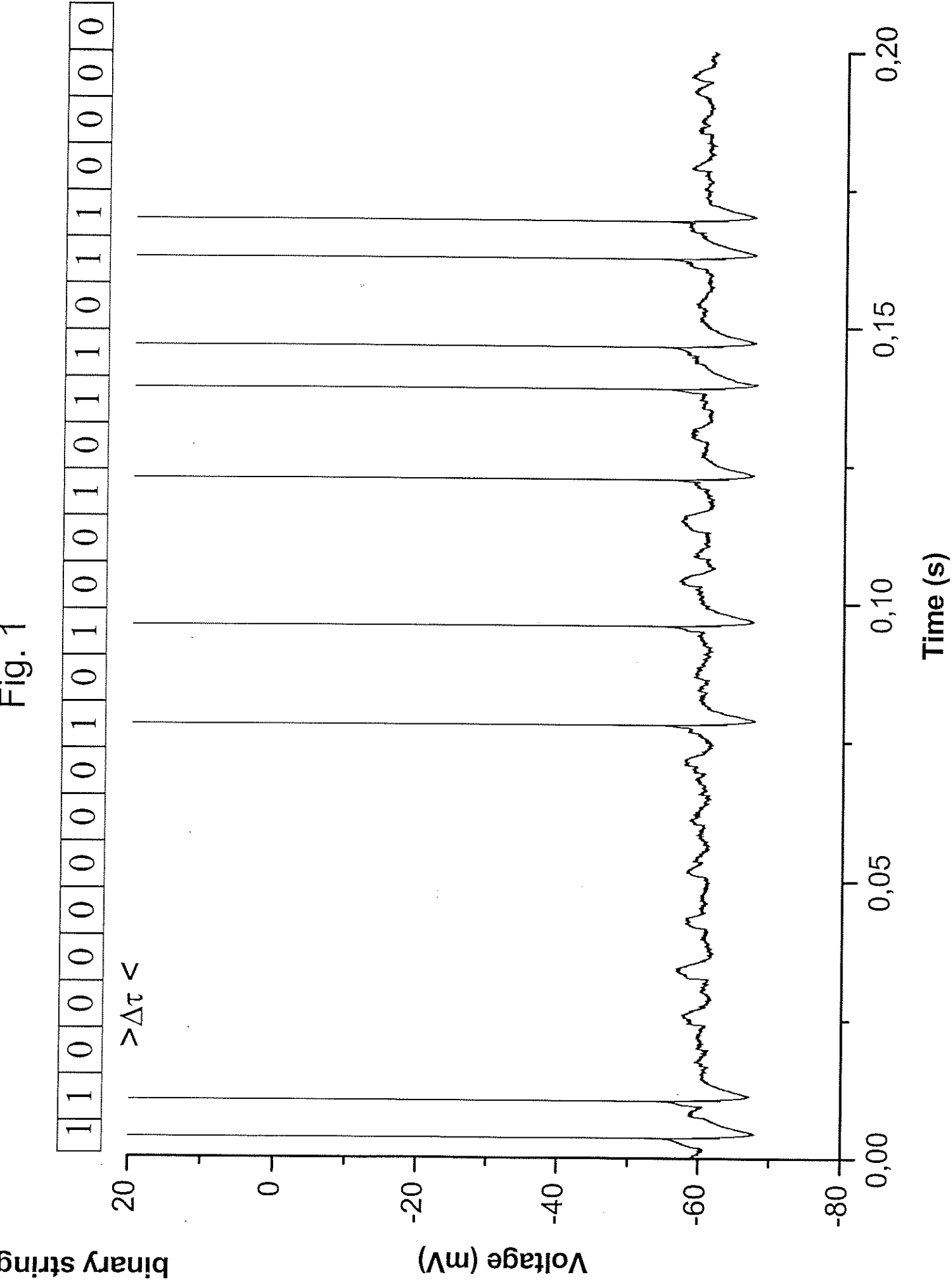
Mean activity $f_i(0)$

Tuning curve $f_i(\theta)$

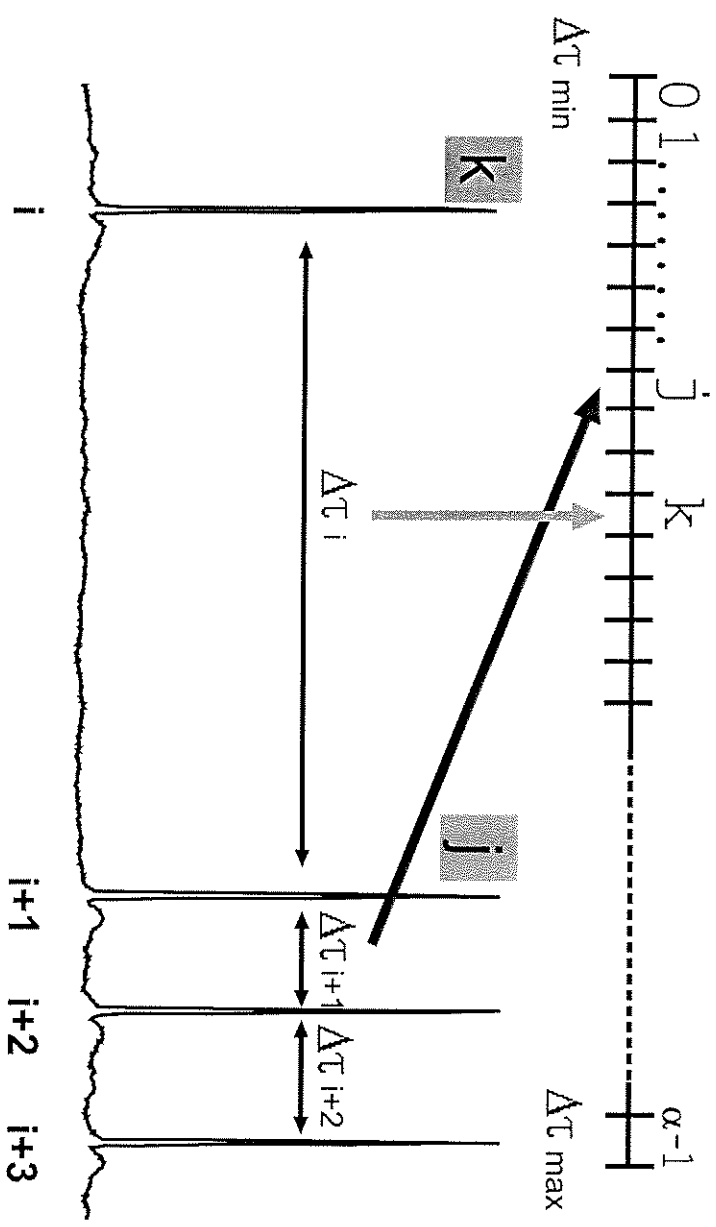


Encoded variable (θ)

Fig. 1

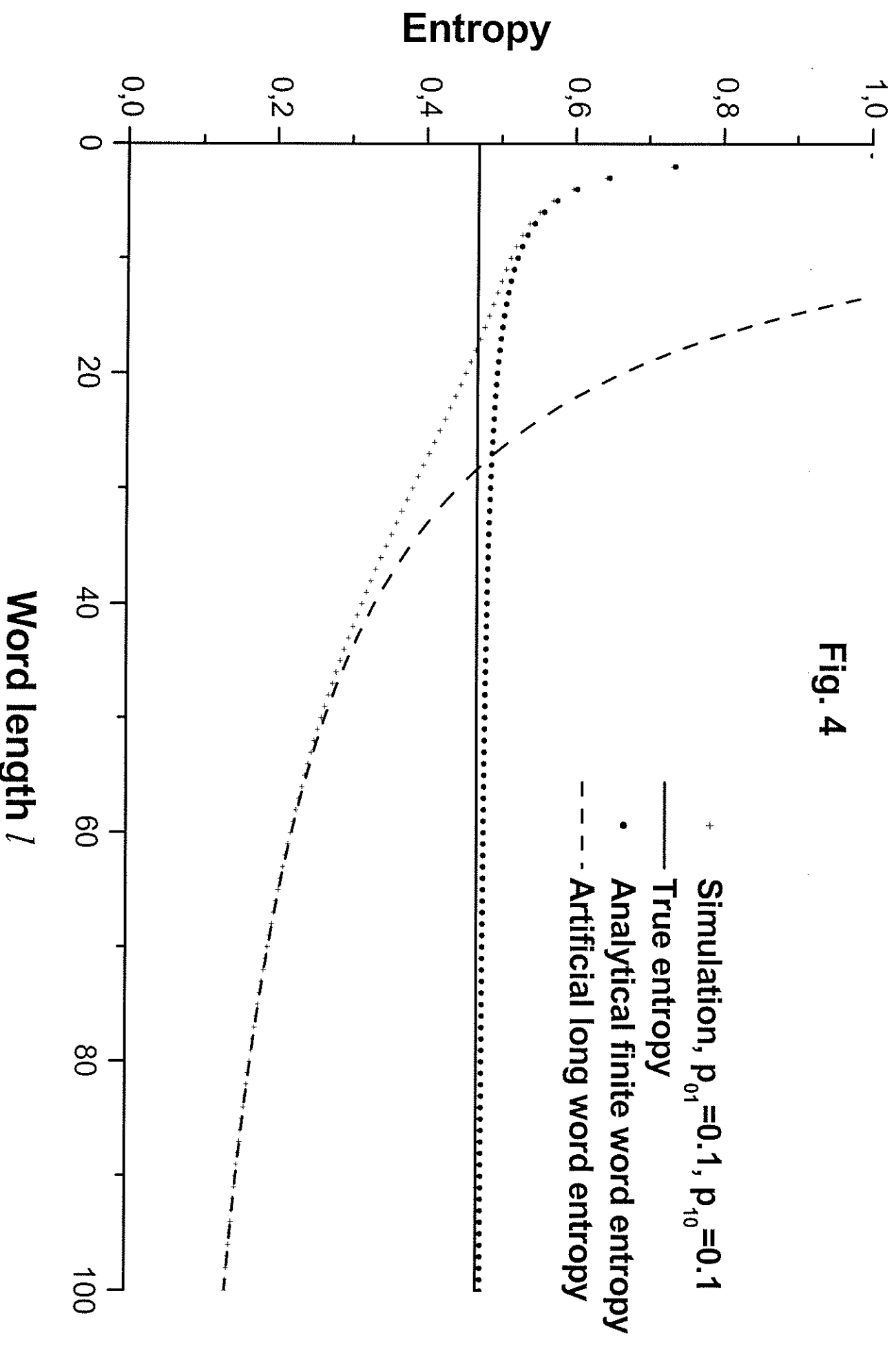


INTERSPIKE TIME CODING



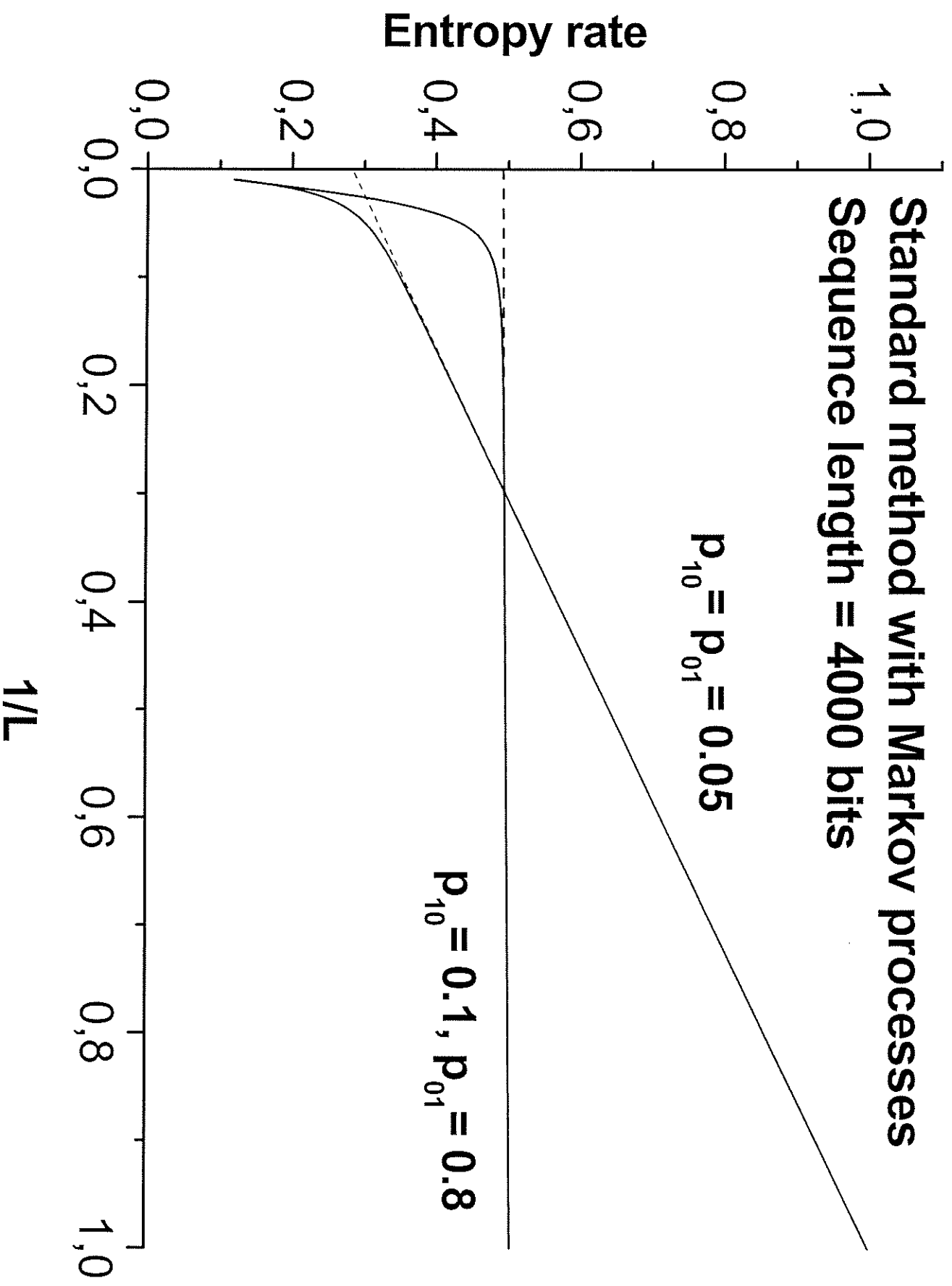
$$\text{NUMBER OF BINS} = \text{NUMBER OF SYMBOLS IN THE ALPHABET}$$

Fig. 4

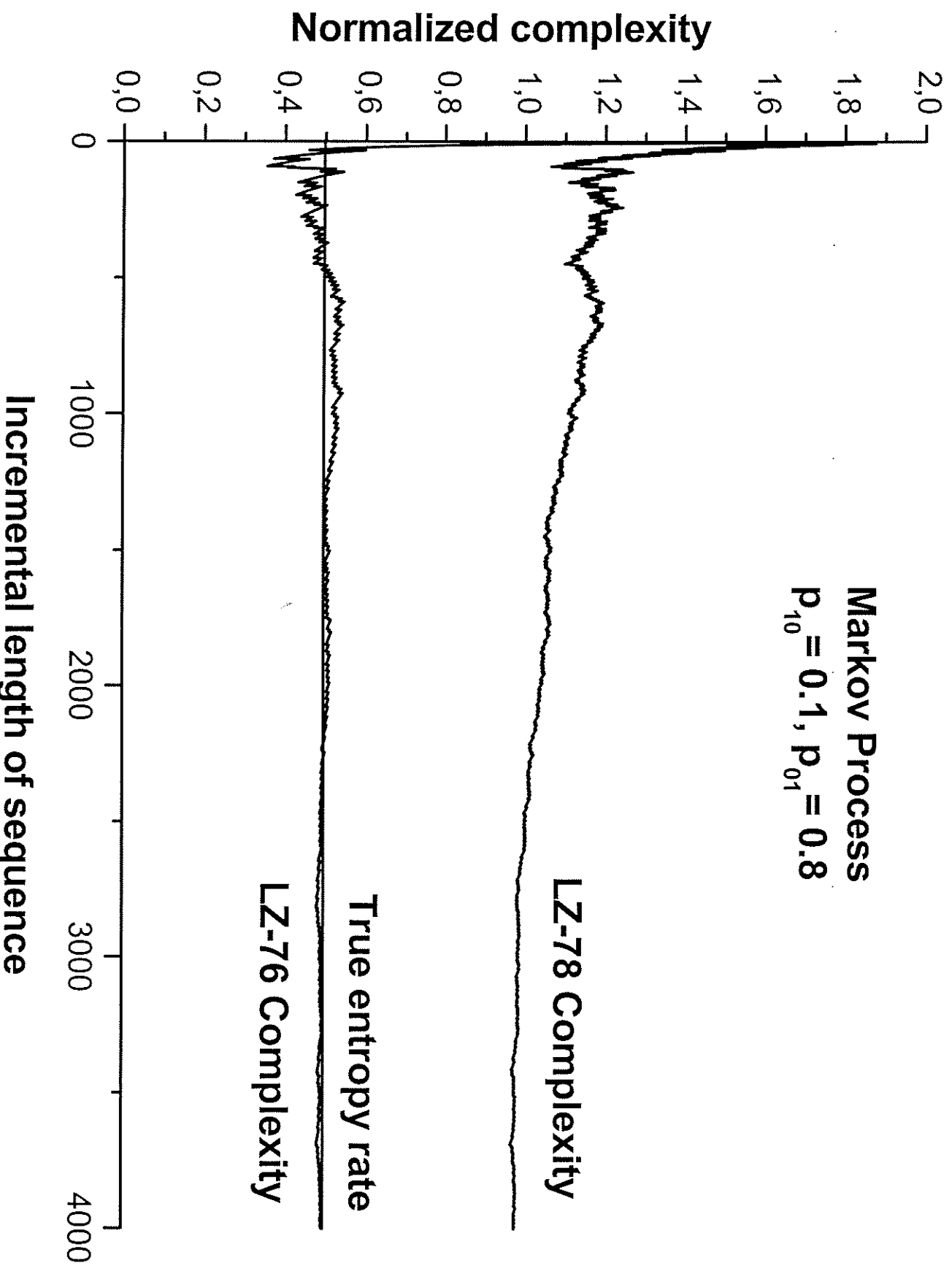


Standard method with Markov processes

Sequence length = 4000 bits



Markov Process
 $p_{10} = 0.1, p_{01} = 0.8$



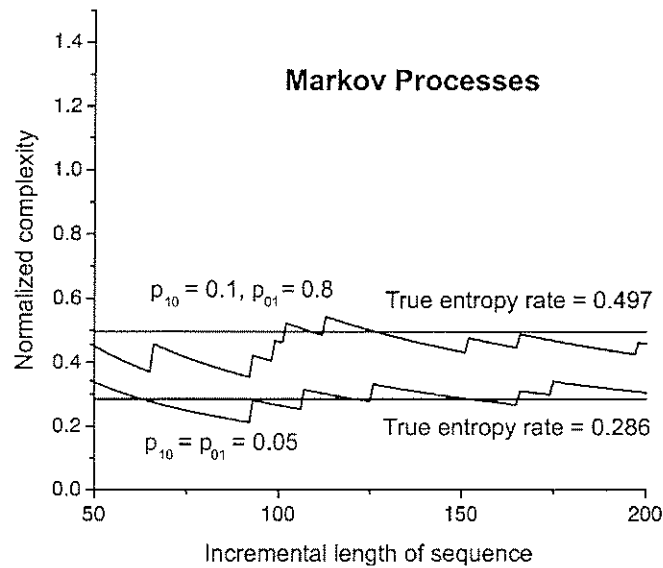


Figure 4: A close-up of the LZ-76 complexity curves of Figures 2 and 3 in the interval $50 \leq n \leq 200$. It can be seen that the normalized complexity rate is already close to the true entropy rate, the relative error being less than 14% around $n = 200$ and 8% at $n = 200$ in either case.

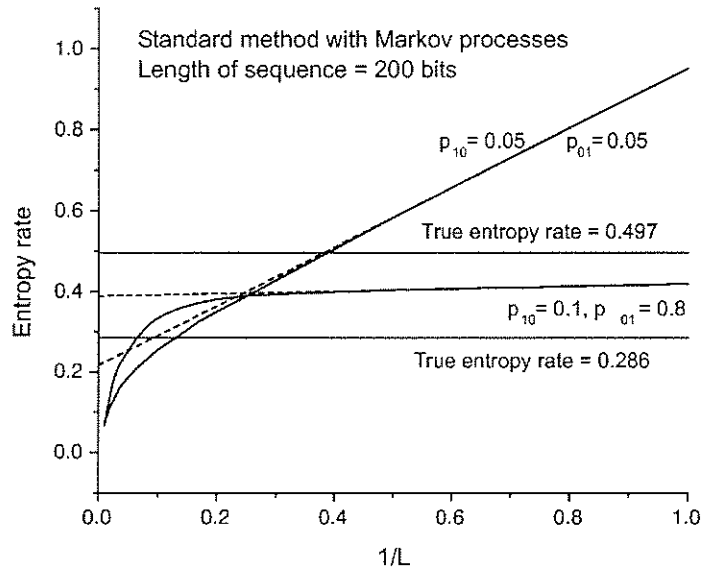
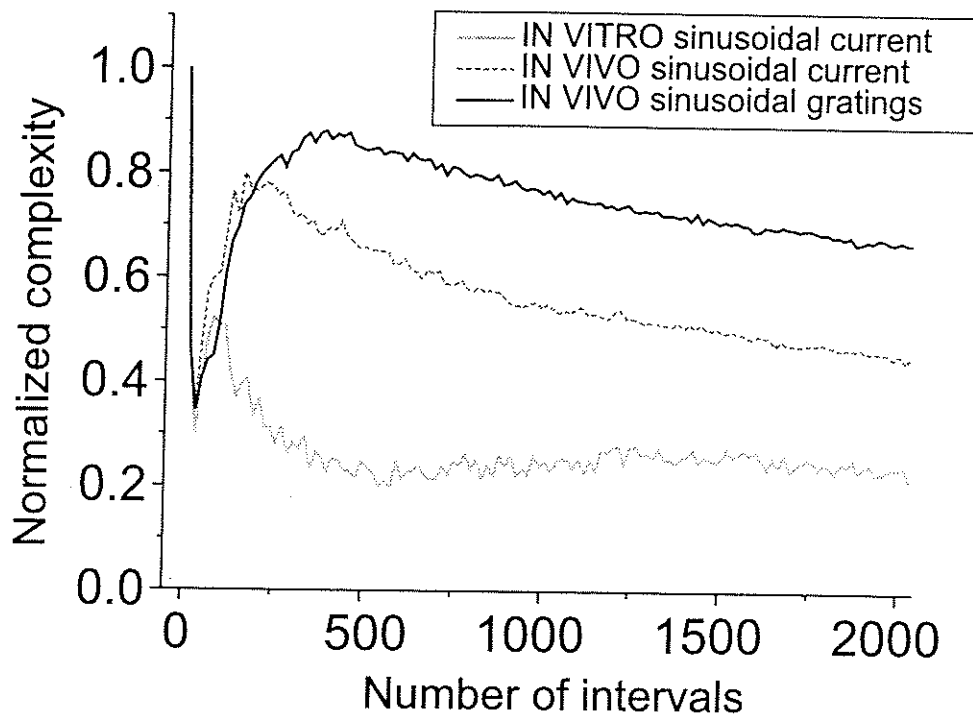


Figure 5: The standard extrapolation technique applied to the same cases as in Figure 4 (sequence length = 200 bits) misses the true entropy rate value by a relative error of 22% (first Markov process) and 24% (second Markov process).

CODIGO TEMPORAL ABSOLUTO



CODIGO TEMPORAL RELATIVO

