School of Informatics, University of Edinburgh

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Remember that plagiarism is a university offence. Please read the policy at:

`http://www.inf.ed.ac.uk/admin/ITO/DivisionalGuidelinesPlagiarism.html`

Practical information

You should produce a digital document for your assignment answers (e.g. with lyx) and submit this electronically using the `submit` command on a DICE machine. The format is e.g. `submit msc nip 1 nipasst1.pdf`

You can check the status of your submissions with the `show_submissions` command. NOTE: postscript or pdf formats are acceptable, other formats are not. Make sure that the file you submit prints ok on the DICE system, in particular when you produced it on a non-Unix machine.

Late submissions

Late submissions will receive a zero mark. Only evidence for illness or other serious reasons can prevent this at the discretion of the instructor. See

`http://www.inf.ed.ac.uk/teaching/years/msc/courseguide09.html#exam`

Unboxing a black box

Download the data set `a1.dat.gz` from the course webpage. It contains two columns of data: the stimulus and the spiking response of a black box neuron.

The stimulus is drawn from a white (i.e. uncorrelated) Gaussian distribution (as you can check for yourself). The response is binary: spike or not. It is given that the response only depends on the current stimulus value and the stimulus at the previous time step.

Question 1 (5 points): Calculate the STA for the neuron.

Question 2 (5 points): Calculate the STC for the neuron.

Question 3 (5 points): Quantify how well you can predict the spikes of the neuron. Note that the spiking might be stochastic. How would you take that into account?

Question 4 (5 points): Think of other ways to model the neuron's response and figure out what the neuron is computing.