

Poster presentation

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## Using stochastic algorithms for constraining compartmental and markov channel models

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Since the work of Hodgkin and Huxley on the squid axon [1], many models were suggested to achieve a more accurate simulations of voltage gated channels and single neurons. In order to check these models, we produced an in-silico neuron, recorded its behavior with a voltage clamp experiment and compared the results with a real neuron voltage clamp. In a previous work a Genetic algorithm was used [2,3] to constrain the parameters of the in-silico neuron. In this work we investigated different stochastic algorithms and compared their performances using several models. The algorithms used were different versions of simulated annealing such as simulated quenching, classic simulated annealing [4] and Particle swarm intelligence with varying social models [5]. The stochastic algorithms were applied to constrain the parameters of ion channels modeled with hidden markov models and electrophysiological parameters of whole cell models. We show that there is no all-purpose algorithm that is the best choice for all the models. Additionally, we show that for each group of models there is an algorithm that out-performed all other algorithms.

### References

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