

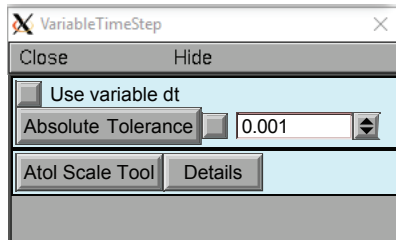
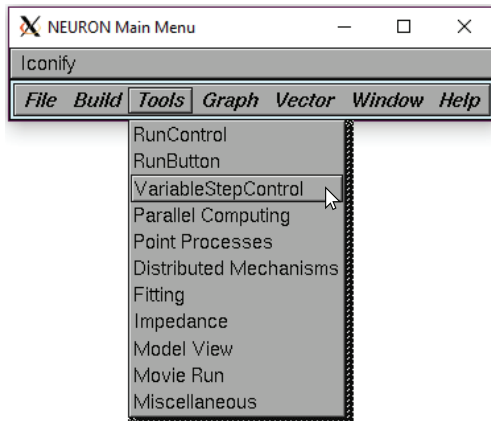
Numerical Methods: Adaptive Integration

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Enabling adaptive integration

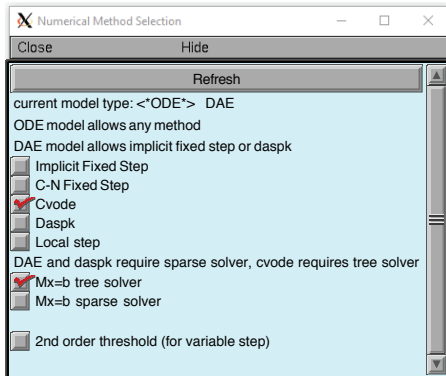
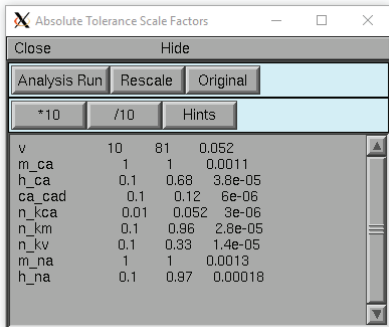
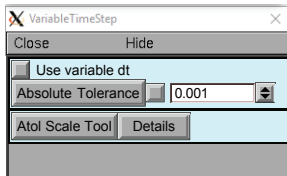


```
h.cvode_active(1)
```

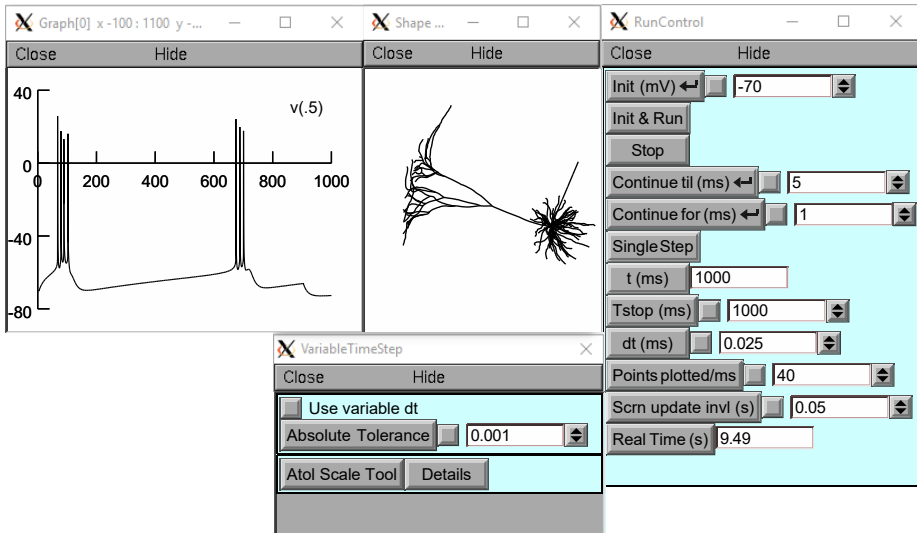
`h.cvode_active` is defined in `stdrun.hoc` which is loaded automatically whenever the gui is imported.

This is a composite image, not a screenshot to allow combining the window decoration and vector-based window contents.

Options: per state variable tolerance, integration methods



Mainen & Sejnowski 1996, Figure 1D, fixed step: 9.49s

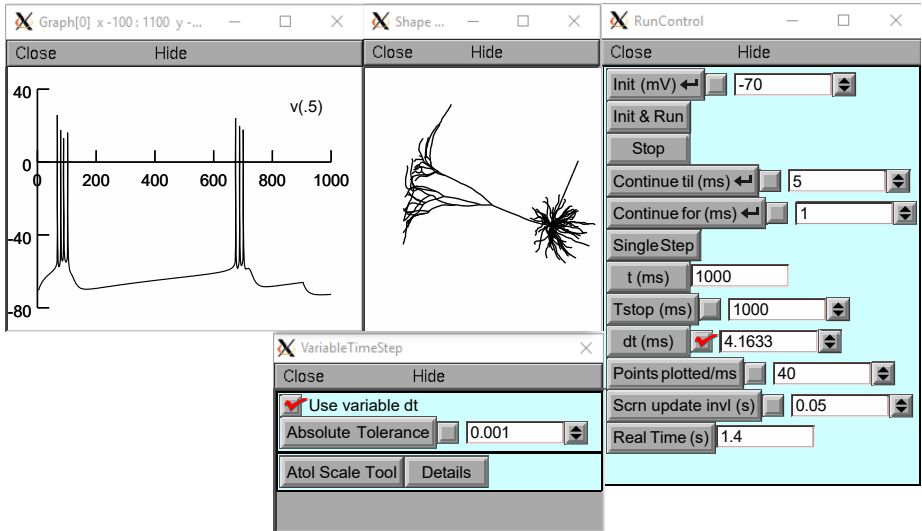


Code for this model is available at: <http://modeldb.yale.edu/2488>

Timings ran with NEURON 7.5 (cbd6261ecbad) on a 3.4 GHz i7-4770 with 24 GB RAM via the Windows Subsystem for Linux in Windows 10.

This is a composite image, not a screenshot to allow combining the window decoration and vector-based window contents.

Mainen & Sejnowski 1996, Figure 1D, variable step: 1.4s

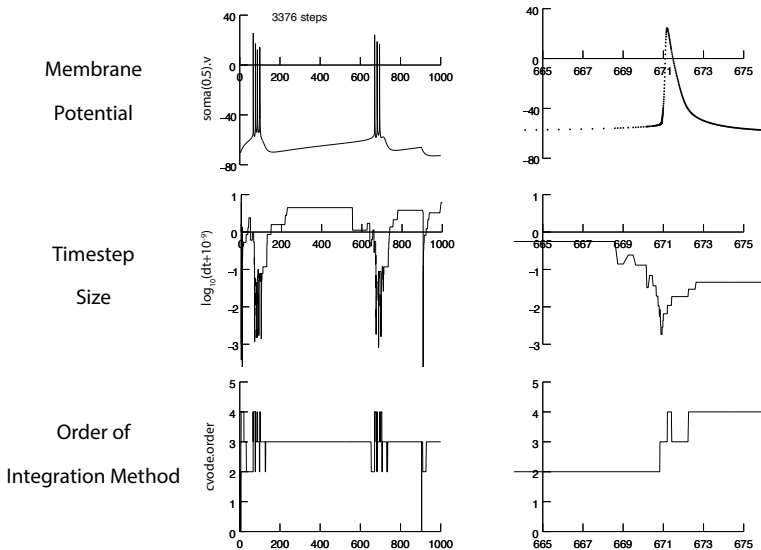


Code for this model is available at: <http://modeldb.yale.edu/2488>

Timings ran with NEURON 7.5 (cbd6261ecbad) on a 3.4 GHz i7-4770 with 24 GB RAM via the Windows Subsystem for Linux in Windows 10.

This is a composite image, not a screenshot. Due to pdf rendering problems, the original checkmarks have been replaced.

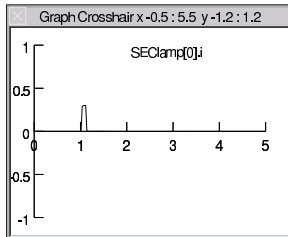
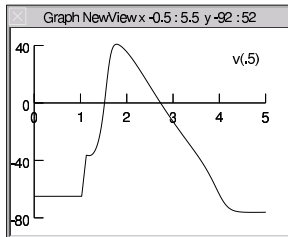
A closer look at change, time steps, and order



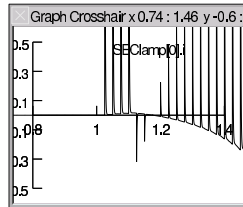
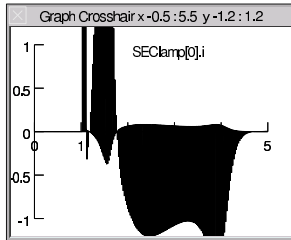
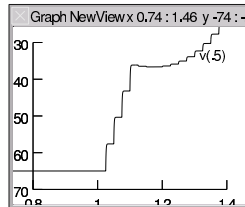
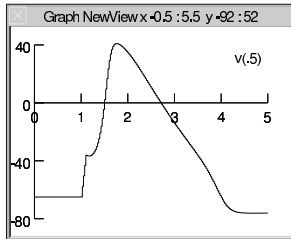
Suppose we inject a current pulse to trigger an action potential that we record at a fixed rate. We then use this time series for a voltage clamp experiment on an identical cell.

What are the dynamics of the current that must be injected through the voltage clamp?

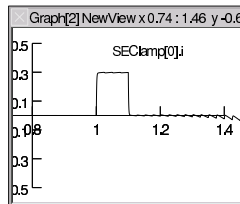
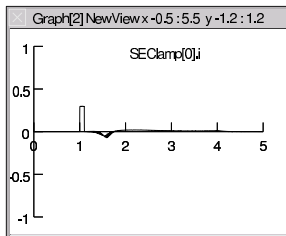
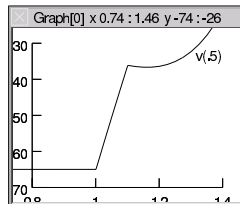
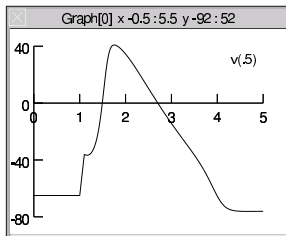
Fixed step (same timestep)



Variable step



Variable step with linear interpolation



```
vvec.play(h.SEClamp[0]._ref_amp1, tvec, 1)
```