

ChannelBuild[0]managedKSChar

Close Hide

Properties

ChannelName

Selective for Ion...

Ohmic  $i = g \cdot (v - e)$

Goldman-Hodgkin-Katz

Defaultgmax (mV)

HH sodium channel

HH potassium channel

Clone channel type

Text to stdout

ChannelBuild[1]managedKSChar

Close Hide

Properties

nahh Density Mechanism

na ohmic ion current

$i_{na} = g_{nahh} \cdot (v - e_{na})$

$g = g_{max} \cdot m^3 \cdot h$

Default gmax = 0 (S/cm2)

$m' = a_m \cdot (1 - m) - b_m \cdot m$

$h' = a_h \cdot (1 - h) - b_h \cdot h$

Default gmax = 0 (S/cm2)

$$m' = am*(1 - m) - bm*m$$
$$h' = ah*(1 - h) - bh*h$$

ChannelBuildGateGUI[0]forChannelBuild[0]

Close

Hide

States Transitions Properties

Select hh state or ks transition to change properties

m

h

m<sup>3</sup>

$$m' = am*(1 - m) - bm*m$$

Power

3

Fractional Conductance

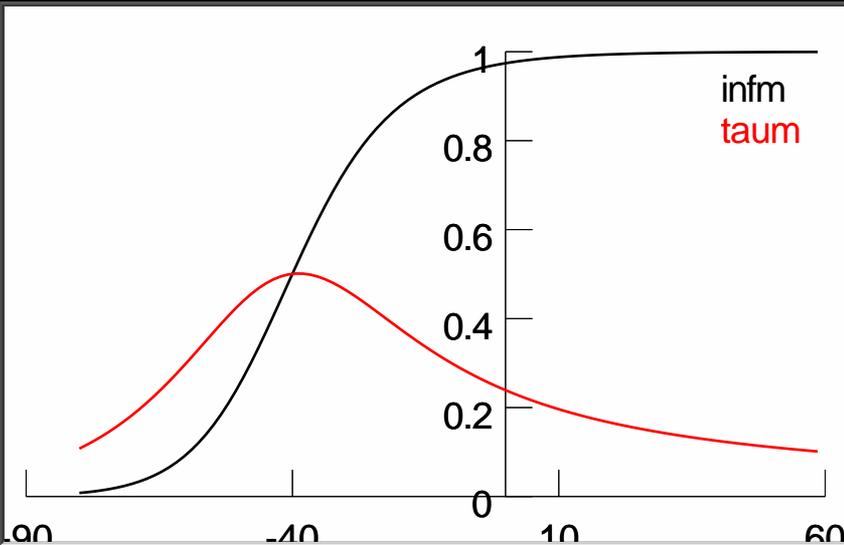
m fraction

1

Adjust



Run



m <-> m (a, b) (KSTrans[0])

Display inf, tau

am = A\*x/(1 - exp(-x)) where x = k\*(v - d)

A

1

k

0.1

d

-40

bm = A\*exp(k\*(v - d))

## nahh Density Mechanism

na ohmic ion current

$$i_{na} = g_{nahh} * (v - e_{na})$$

$$g = g_{max} * m^3 * h$$

Default  $g_{max} = 0$  (S/cm<sup>2</sup>)

$$m' = a_m * (1 - m) - b_m * m$$

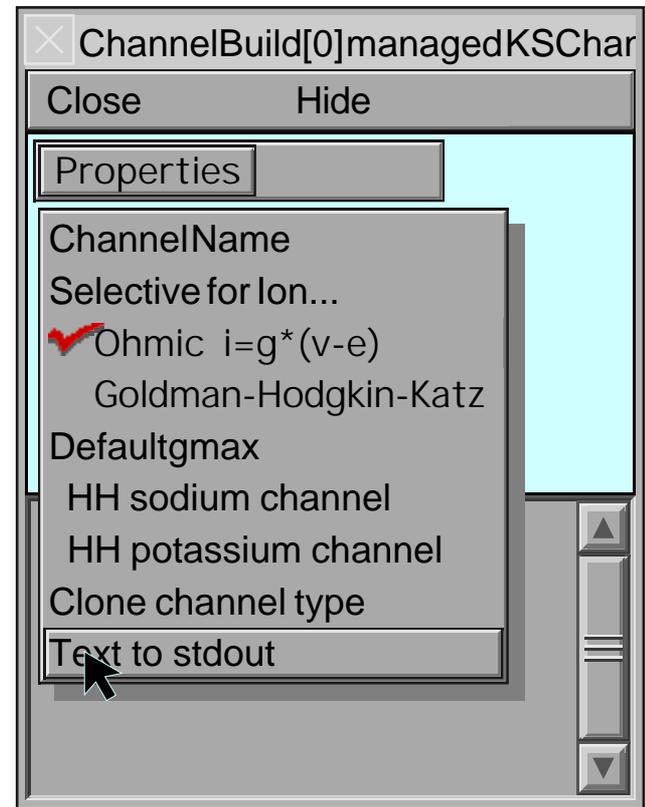
$$a_m = 1 * x / (1 - \exp(-x)) \text{ where } x = 0.1 * (v + 40) \quad (\text{KSTrans}[0])$$

$$b_m = 4 * \exp(-0.05556 * (v + 65)) \quad (\text{Vector}[7])$$

$$h' = a_h * (1 - h) - b_h * h \quad (\text{Vector}[8])$$

$$a_h = 0.07 * \exp(-0.05 * (v + 65)) \quad (\text{KSTrans}[1])$$

$$b_h = 1 / (1 + \exp(-0.1 * (-35 - v))) \quad (\text{Vector}[11])$$



(KSTrans[0])

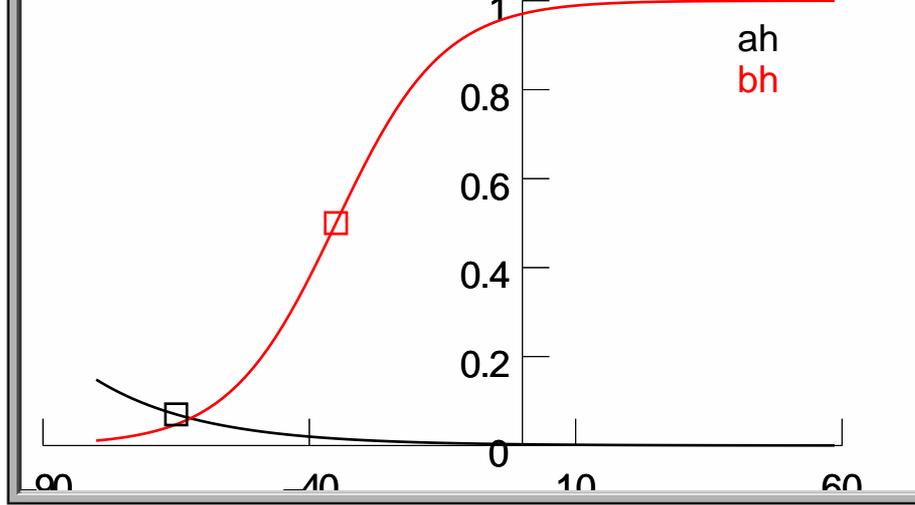
(Vector[7])

(Vector[8])

(KSTrans[1])

(Vector[11])

(Vector[12])

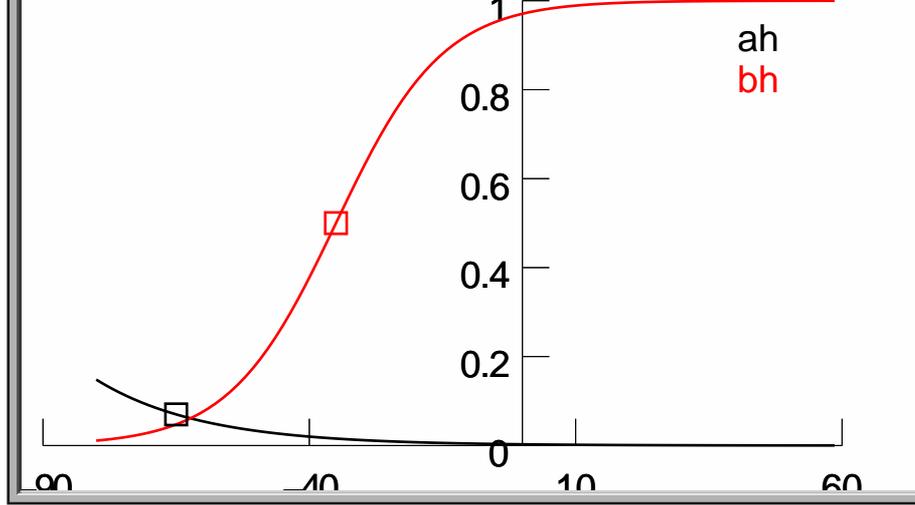


$$bh = A / (1 + \exp(k * (d - v)))$$

A	1
k	-0.1
d	-35

EquationType

- alpha,beta
- ah
- bh
- a,b
- inf,tau



$$bh = A / (1 + \exp(k * (d - v)))$$

A	1
k	-0.1
d	-35

EquationType

- alpha, beta
- ah
  - A
- bh
  - $A * \exp(k * (v - d))$
  - $A * x / (1 - \exp(-x))$  where  $x = k * (v - d)$
  - $A / (1 + \exp(k * (d - v)))$
  - KSChanBGa

ah  
bh

$$\text{tauh} = A \cdot \exp(k \cdot (v - d))$$

A	1
k	-0.1
d	-35

EquationType

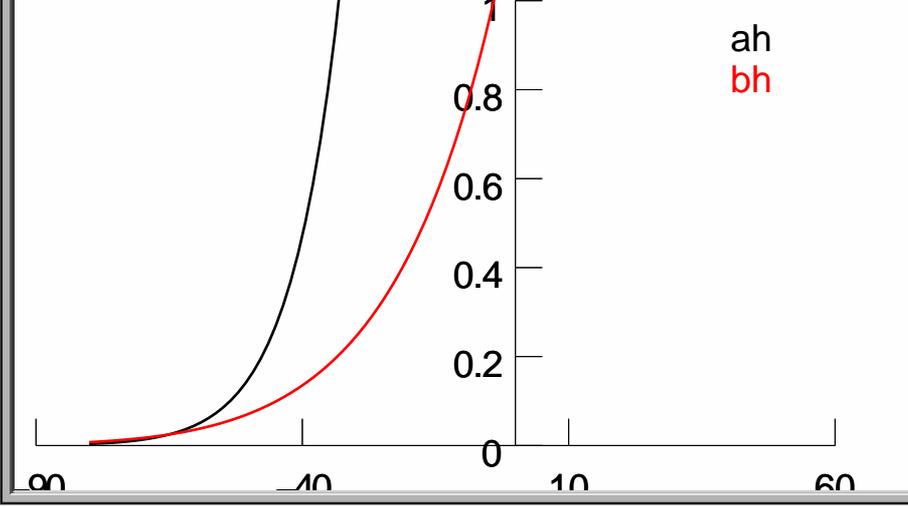
inf,tau

inh

tauh

A

$A / (1 + \exp(k \cdot (d - v)))$



ChannelBuildGateGUI[0]forChannelBuild[0]

Close Hide

◆ States ◆ Transitions ◆ Properties

no gate selected

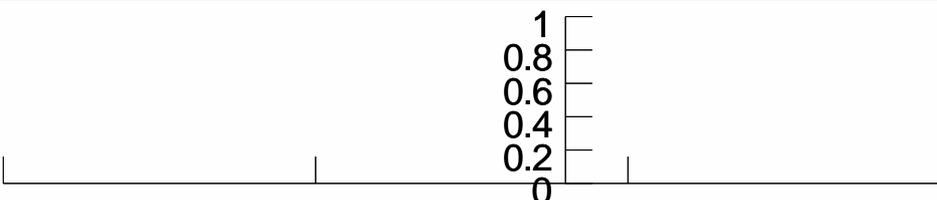
Drag new state from left. Drag off canvas to delete

O  
C

C C2

◆ Adjust  Run

no KSTrans selected



The image shows a software interface for a channel build gate GUI. The window title is "ChannelBuildGateGUI[0]forChannelBuild[0]". At the top, there are "Close" and "Hide" buttons. Below that is a tabbed interface with three tabs: "States", "Transitions", and "Properties". The "States" tab is active and contains a canvas with the text "Drag new state from left. Drag off canvas to delete". On the left side of the canvas, there are two state labels: "O" and "C". A mouse cursor is pointing at the "C" label, which has a red circle around it. In the center of the canvas, there are two more state labels: "C" and "C2". To the right of the "States" tab is a light blue area with the text "no gate selected". Below the "States" tab is another tabbed interface with two tabs: "Adjust" and "Run". The "Adjust" tab is active and contains a vertical axis with tick marks at 0, 0.2, 0.4, 0.6, 0.8, and 1. To the right of the "Adjust" tab is a light blue area with the text "no KSTrans selected" and a vertical scrollbar.

ChannelBuildGateGUI[0]forChannelBuild[0]

Close

Hide

States **Transitions** Properties

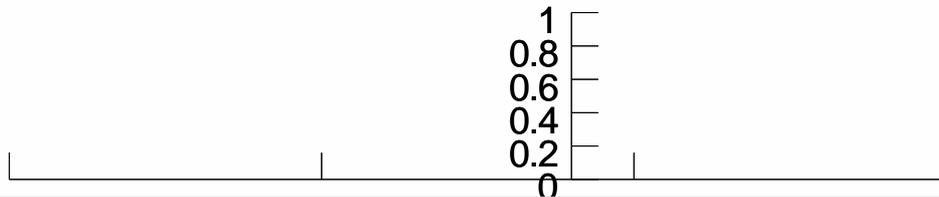
no gate selected

New transition pair: select source and drag to target



Adjust  Run

no KSTrans selected



ChannelBuildGateGUI[0]forChannelBuild[0]

Close

Hide

States Transitions Properties

Select hh state or ks transition to change properties



O

O: 3 state, 2 transitions

Power

1

Fractional Conductance

C2 fraction

0

O fraction

1

Adjust

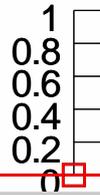
Run

bC2O = A

A

0

EquationType



aC2O  
bC2O

alpha,beta

a,b

aC2O

inf,tau

bC2O

nai

nao

ki

ko

cai

cao

ChannelBuildGateGUI[0]forChannelBuild[0]

Close Hide

States Transitions Properties

Select hh state or ks transition to change properties

$$C \xrightleftharpoons{v} C2 \xrightleftharpoons{cai} O$$

O  
O: 3 state, 2 transitions

Power 1

Fractional Conductance

C2 fraction 0

O fraction 1

Adjust Run

C2 + cai <-> O (a, b) (KSTrans[9])  
 Display inf, tau  
 aC2O = A

1  
0.8  
0.6  
0.4  
0.2  
0

aC2O  
bC2O

ChannelBuild[0]managedKSChar

Close Hide

Properties

kca Density Mechanism

k ohmic ion current

$$i_k = g\_kca * (v - e_k)$$

$$g = gmax * O$$

Default gmax = 0 (S/cm2)

O: 3 state 2 transitions

ChannelBuild[0]managedKSChan[0]

Close Hide

Properties

leak Density Mechanism  
 NonSpecific ohmic ion current

$$i_{leak} = g_{leak} * (v - e_{leak})$$

$$g = gmax * O * O2 * O3$$

Default gmax = 0 (S/cm2) e = 0 (mV)

O: 3 state, 2 transitions  
 O2: 2 state, 1 transitions  
 $O3' = aO3*(1 - O3) - bO3*O3$

ChannelBuildGateGUI[0]forChannelBuild[0]

Close Hide

◆ States ◆ Transitions ◆ Properties

no gate selected

Drag new state from left. Drag off canvas to delete

O  
C

$$C \xleftrightarrow{v} C2 \xleftrightarrow{v} O$$

$$C3 \xleftrightarrow{v} O2$$

O3

nrniv

Change state name

O3

Accept ← Cancel

◆ Adjust Run

no KSTrans selected

1

ChannelBuild[0]managedKSChar

Close Hide

Properties

ChannelName

Selective for Ion...

Ohmic  $i=g*(v-e)$

Goldman-Hodgkin-Katz

Defaultgmax

HH sodium channel

HH potassium channel

Clone channel type

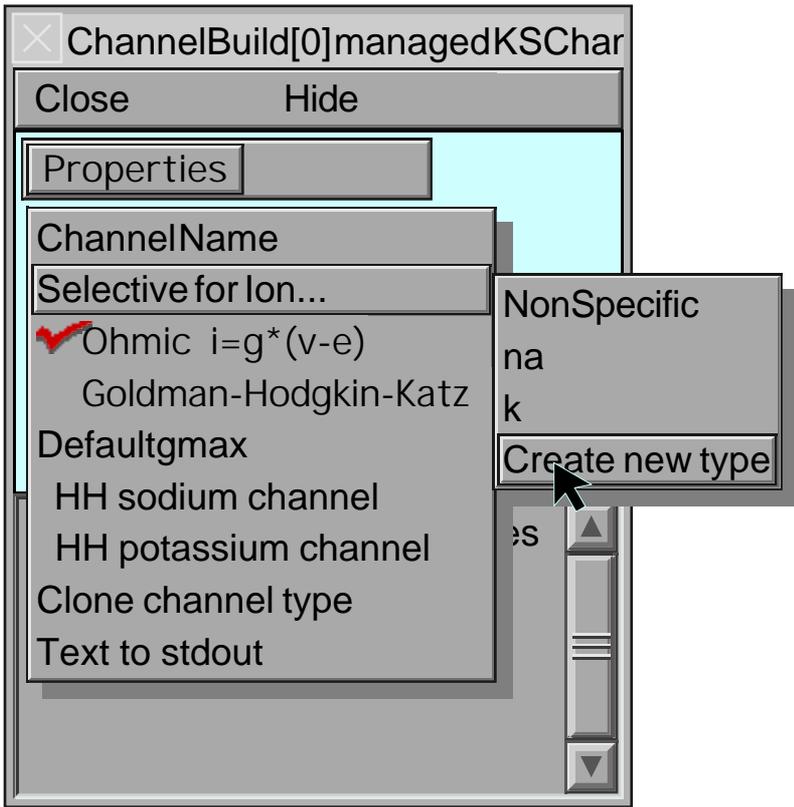
Text to stdout

NonSpecific

na

k

Create new type



ChannelBuild[0]managedKSChar

Close Hide

Properties

leak Density Mechanism  
cl ohmic ion current  
 $icl = g\_leak * (v - ecl)$   
g is a RANGE PARAMETER  
Default g = 0 (S/cm2)

Select here to construct gates

nrniv

ionname charge --e.g. ca2

cl-1

Accept ← Cancel