A	Model Summary
Populations	27: EP, X_FEF, LIP_EP, LIP_CD, Xh, V1, AuxV1, V4L4, V4L23, FEFv, FEFvm, FEFm, PFC, AuxA, AuxE, FEFfix, HD, BVC, PR, oPR, PW, H, TR, IP, oPW, OVC, oTR
Connectivity	Sparse connectivity matrix, User-defined, Convolution, Pooling, One-to-One, Connectivity matrix, All-to-All
Neuron models	AuxV1_Neuron, EP_Neuron, OVC_Neuron, H_Neuron, Xh_Neuron, LIPCD_Neuron, FEFv_Neuron, XFEF_Neuron, FEFvm_Neuron, IP_Neuron, oTR_Neuron, TR_Neuron, FEFm_Neuron, PR_Neuron, V4L23_Neuron, HD_Neuron, oPR_Neuron, oPW_Neuron, PW_Neuron, Input_Neuron, LIPEP_Neuron, Aux_Neuron, BVC_Neuron, V4L4_Neuron
Plasticity	Convolution operation, Pooling operation

B	Populations	
Name	**Elements**	**Size**
EP	EP_Neuron	$N_{\mathrm{EP}} = 336$ (21*16)
X_FEF	XFEF_Neuron	$N_{\mathrm{X\_FEF}} = 112896$ (21*16*21*16)
LIP_EP	LIPEP_Neuron	$N_{\mathrm{LIP\_EP}} = 112896$ (21*16*21*16)
LIP_CD	LIPCD_Neuron	$N_{\mathrm{LIP\_CD}} = 112896$ (21*16*21*16)
Xh	Xh_Neuron	$N_{\mathrm{Xh}} = 336$ (21*16)
V1	V1_Neuron	$N_{\mathrm{V1}} = 158400$ (66*50*3*16)
AuxV1	AuxV1_Neuron	$N_{\mathrm{AuxV1}} = 158400$ (66*50*3*16)
V4L4	V4L4_Neuron	$N_{\mathrm{V4L4}} = 99000$ (66*50*30)
V4L23	V4L23_Neuron	$N_{\mathrm{V4L23}} = 24750$ (33*25*30)
FEFv	FEFv_Neuron	$N_{\mathrm{FEFv}} = 3300$ (66*50)
FEFvm	FEFvm_Neuron	$N_{\mathrm{FEFvm}} = 19800$ (66*50*6)
FEFm	FEFm_Neuron	$N_{\mathrm{FEFm}} = 3300$ (66*50)
FEFfix	Input_Neuron	$N_{\mathrm{FEFfix}} = 1$
PFC	Input_Neuron	$N_{\mathrm{PFC}} = 30$
AuxA	Aux_Neuron	$N_{\mathrm{AuxA}} = 3300$ (66*50)
AuxE	Aux_Neuron	$N_{\mathrm{AuxE}} = 825$ (33*25)
HD	HD_Neuron	$N_{\mathrm{HD}} = 100$
BVC	BVC_Neuron	$N_{\mathrm{BVC}} = 816$
PR	PR_Neuron	$N_{\mathrm{PR}} = 4$
oPR	oPR_Neuron	$N_{\mathrm{oPR}} = 9$
PW	PW_Neuron	$N_{\mathrm{PW}} = 816$
H	H_Neuron	$N_{\mathrm{H}} = 1936$
TR	TR_Neuron	$N_{\mathrm{TR}} = 16320$ (816*20)
IP	IP_Neuron	$N_{\mathrm{IP}} = 1$
oPW	oPW_Neuron	$N_{\mathrm{oPW}} = 816$
OVC	OVC_Neuron	$N_{\mathrm{OVC}} = 816$
oTR	oTR_Neuron	$N_{\mathrm{oTR}} = 16320$ (816*20)

C		Connectivity		
Source	**Destination**	**Target**	**Synapse**	**Pattern**
EP	X_FEF	EP	-	Created by the method gaussian2dTo4d_v
EP	LIP_EP	EP	-	Created by the method gaussian2dTo4d_v
Xh	LIP_EP	FB	-	Created by the method gaussian2dTo4d_diag
LIP_EP	LIP_EP	exc	-	Created by the method all2all_exp4d
X_FEF	LIP_CD	CD	-	Created by the method gaussian4d_diagTo4d_v
Xh	LIP_CD	FB	-	Created by the method gaussian2dTo4d_diag
LIP_EP	Xh	EP	-	Created by the method gaussian4dTo2d_diag
LIP_EP	Xh	EP_neglect	-	Created by the method gaussian4dTo2d_diag
LIP_CD	Xh	CD	-	Created by the method gaussian4dTo2d_diag
LIP_CD	Xh	CD_neglect	-	Created by the method gaussian4dTo2d_diag
Xh	Xh	exc	-	Created by the method all2all_exp2d
Xh	Xh	inh	-	Created by the method all2all_exp2d
Xh	LIP_EP	SSP	-	Created by the method sur2dTo4d_diag
Xh	LIP_CD	SSP	-	Created by the method sur2dTo4d_diag
V1	AuxV1	exc	-	One-to-One, weights 1.0, delays 5.0
AuxV1	V4L4	exc	Convolution operation	Convolution
V4L4	V4L23	exc	Convolution operation	Convolution
V4L23	V4L4	A_FEAT	Convolution operation	Convolution
V4L23	V4L4	S_FEAT	Convolution operation	Convolution
V4L23	V4L4	S_SUR	Convolution operation	Convolution
AuxA	V4L4	A_SP	Convolution operation	Convolution
AuxA	V4L4	S_SP	Convolution operation	Convolution
V4L23	AuxE	exc	Pooling operation	Pooling
AuxE	FEFv	exc	-	Created by the method con_scale
FEFv	FEFvm	E_v	Convolution operation	Convolution
FEFv	FEFvm	S_v	Convolution operation	Convolution
FEFvm	AuxA	exc	Pooling operation	Pooling

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C		Connectivity		
Source	**Destination**	**Target**	**Synapse**	**Pattern**
FEFvm	FEFm	vm	Pooling operation	Pooling
FEFm	FEFvm	E˙m	Convolution operation	Convolution
FEFfix	FEFm	fix	-	All-to-All, weights 1.0, delays 0.0
PFC	V4L23	A_PFC	-	Created by the method one_to_dim
HD	HD	HD2HD	-	Connectivity matrix
HD	HD	HDRotCCW	-	Connectivity matrix
HD	HD	HDRotCW	-	Connectivity matrix
HD	IP	HD2IP	-	All-to-All, weights 1.0, delays 0.025
IP	TR	IP2TR	-	All-to-All, weights 1.0, delays 0.025
IP	oTR	IP2oTR	-	All-to-All, weights 1.0, delays 0.025
H	BVC	H2BVC	-	Connectivity matrix
BVC	H	BVC2H	-	Connectivity matrix
H	PR	H2PR	-	Connectivity matrix
H	oPR	H2oPR	-	Connectivity matrix
oPR	H	oPR2H	-	Connectivity matrix
oPR	PW	oPR2PW	-	Connectivity matrix
oPR	HD	oPR2HD	-	Connectivity matrix
BVC	oPR	BVC2oPR	-	Connectivity matrix
oPR	BVC	oPR2BVC	-	Connectivity matrix
oPR	oPR	oPR2oPR	-	Connectivity matrix
PR	H	PR2H	-	Connectivity matrix
PR	PR	PR2PR	-	Connectivity matrix
PR	BVC	PR2BVC	-	Connectivity matrix
BVC	PR	BVC2PR	-	Connectivity matrix
BVC	BVC	BVC2BVC	-	Connectivity matrix
H	OVC	H2OVC	-	Connectivity matrix
OVC	H	OVC2H	-	Connectivity matrix
OVC	BVC	OVC2BVC	-	Connectivity matrix
BVC	OVC	BVC2OVC	-	Connectivity matrix
OVC	OVC	OVC2OVC	-	Connectivity matrix
OVC	oPR	OVC2oPR	-	Connectivity matrix
oPR	OVC	oPR2OVC	-	Connectivity matrix
BVC	TR	BVC2TR	-	Sparse connectivity matrix
TR	BVC	TR2BVC	-	Sparse connectivity matrix
OVC	oTR	OVC2oTR	-	Sparse connectivity matrix

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C		Connectivity		
Source	**Destination**	**Target**	**Synapse**	**Pattern**
oTR	OVC	oTR2OVC	-	Sparse connectivity matrix
TR	PW	TR2PW	-	Sparse connectivity matrix
PW	TR	PW2TR	-	Sparse connectivity matrix
oTR	oPW	oTR2oPW	-	Sparse connectivity matrix
oPW	oTR	oPW2oTR	-	Sparse connectivity matrix
HD	TR	HD2TR	-	Connectivity matrix
HD	oTR	HD2oTR	-	Connectivity matrix
H	H	H2H	-	Connectivity matrix
PW	PW	PW2PW	-	All-to-All, weights 1, delays 0.05
oTR	oTR	oTR2oTR	-	Created by the method layer-wise_inhibition
FEFm	X_FEF	CD	-	Created by the method gaussian2dTo4d_h
FEFm	LIP_EP	FEF	-	Created by the method gaussian2dTo4d_h
FEFm	LIP_CD	FEF	-	Created by the method gaussian2dTo4d_h
LIP_EP	FEFv	LIP1	-	Created by the method gaussian4dTo2d_h
LIP_CD	FEFv	LIP2	-	Created by the method gaussian4dTo2d_h
AuxE	LIP_EP	V4	-	Created by the method gaussian2dTo4d_h
AuxE	LIP_CD	V4	-	Created by the method gaussian2dTo4d_h

D	Neuron Models
Name	EP_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$\frac{dr_{\text{change}}(t)}{dt} \cdot \tau + r(t) = (\text{baseline})^{+}$ $r(t) = \begin{cases} 0 & \text{if} \quad r_{\text{change}}(t) < 1.0 \cdot 10^{-5} \\ r_{\text{change}}(t) & \text{otherwise.} \end{cases}$

Name	XFEF_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$\mathrm{num}_{\mathrm{neurons}}(t) = \text{num-neurons-h}^2 \cdot \text{num-neurons-w}^2$ $\frac{dr_{\mathrm{change}}(t)}{dt} \cdot \tau + r(t) = X_{\mathrm{FEFsc}} \cdot \sum_{\mathrm{CD}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \sum_{\mathrm{EP}} w \cdot r^{\mathrm{pre}}(t-d) - w_{\mathrm{inh}} \cdot r(t) \cdot \mathrm{num}_{\mathrm{neurons}}(t) \cdot \mathrm{mean}\left(r(t)\right)$ $r(t) = \begin{cases} 0 & \text{if} \quad r_{\mathrm{change}}(t) < 1.0 \cdot 10^{-5} \\ r_{\mathrm{change}}(t) & \text{otherwise.} \end{cases}$

Name	LIPEP_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$\mathrm{num}_{\mathrm{neurons}}(t) = \text{num-neurons-h}^2 \cdot \text{num-neurons-w}^2$ $\frac{dr_{\mathrm{change}}(t)}{dt} \cdot \tau + r(t) = \sum_{\mathrm{FB}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \sum_{\mathrm{EP}} w \cdot r^{\mathrm{pre}}(t-d) - \sum_{\mathrm{SSP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vSSP} + \sum_{\mathrm{exc}} w \cdot r^{\mathrm{pre}}(t-d) + \sum_{\mathrm{EP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \left(\sum_{\mathrm{V4}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{FFsc} + \sum_{\mathrm{FEF}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{FEFsc}\right) \cdot \left(A - \max\left(r(t)\right)\right)^{+} - w_{\mathrm{inh}} \cdot \mathrm{num}_{\mathrm{neurons}}(t) \cdot (D + r(t)) \cdot \mathrm{mean}\left(r(t)\right)$ $r(t) = \begin{cases} 0 & \text{if} \quad r_{\mathrm{change}}(t) < 1.0 \cdot 10^{-5} \\ r_{\mathrm{change}}(t) & \text{otherwise.} \end{cases}$

Name	LIPCD_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$$\mathrm{num}_{\mathrm{neurons}}(t) = \text{num-neurons-h}^2 \cdot \text{num-neurons-w}^2$$ $$\begin{aligned}\frac{dr_{\mathrm{change}}(t)}{dt} \cdot \tau + r(t) = &\sum_{\mathrm{FB}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \sum_{\mathrm{CD}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{FBsc} - \sum_{\mathrm{SSP}} w \cdot r^{\mathrm{pre}}(t-d) \\ &\cdot \mathrm{vSSP} - w_{\mathrm{inh}} \cdot \mathrm{num}_{\mathrm{neurons}}(t) \cdot (D + r(t)) \cdot \mathrm{mean}\left(r(t)\right) \\ &+ \left(\sum_{\mathrm{V4}} w \cdot r^{\mathrm{pre}}(t-d) + \sum_{\mathrm{FEF}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{FEFsc}\right) \\ &\cdot \left(\sum_{\mathrm{CD}} w \cdot r^{\mathrm{pre}}(t-d) \cdot (A - r(t))^{+} + 1\right)\end{aligned}$$ $$r(t) = \begin{cases} 0 & \text{if} \quad r_{\mathrm{change}}(t) < 1.0 \cdot 10^{-5} \\ r_{\mathrm{change}}(t) & \text{otherwise.} \end{cases}$$

Name	Xh_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$$\begin{aligned}&\mathrm{LIP}_{\mathrm{input}}(t) \\ &\quad = \begin{cases} \mathrm{NEsc} \cdot \left(\sum_{\mathrm{EP\_neglect}} w \cdot r^{\mathrm{pre}}(t-d) + \sum_{\mathrm{CD\_neglect}} w \cdot r^{\mathrm{pre}}(t-d)\right) & \text{if} \quad \text{neglect} \\ \mathrm{FFsc} \cdot \left(\sum_{\mathrm{CD}} w \cdot r^{\mathrm{pre}}(t-d) + \sum_{\mathrm{EP}} w \cdot r^{\mathrm{pre}}(t-d)\right) & \text{otherwise.} \end{cases}\end{aligned}$$ $$\mathrm{input}(t) = \mathrm{baseline} + \mathrm{LIP}_{\mathrm{input}}(t)$$ $$s(t) = s(t) + \frac{\mathrm{dt}_{\mathrm{dep}} \cdot (-s(t) + \mathrm{input}(t))}{\tau_{\mathrm{dep}}}$$ $$\mathrm{S2}(t) = -d_{\mathrm{dep}} \cdot s(t) + 1$$ $$\mathrm{num}_{\mathrm{neurons}}(t) = \text{num-neurons-h} \cdot \text{num-neurons-w}$$ $$\mathrm{inh}(t) = \sum_{\mathrm{inh}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{INHsc} \cdot (D + r(t))$$ $$\frac{dr_{\mathrm{change}}(t)}{dt} \cdot \tau + r(t) = \sum_{\mathrm{exc}} w \cdot r^{\mathrm{pre}}(t-d) + \mathrm{S2}(t) \cdot \mathrm{input}(t) - \mathrm{inh}(t)$$ $$r(t) = \begin{cases} 0 & \text{if} \quad r_{\mathrm{change}}(t) < 1.0 \cdot 10^{-5} \\ r_{\mathrm{change}}(t) & \text{otherwise.} \end{cases}$$

Name	Input_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	

Name	Aux_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$r(t) = \sum_{\text{exc}} w \cdot r^{\text{pre}}(t-d)$

Name	AuxV1_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$r(t) = \text{pow}\left(\sum_{\text{exc}} w \cdot r^{\text{pre}}(t-d), \text{pV1C}\right)$

Name	V4L4_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$E(t) = \mathrm{pow}\left(\mathrm{vV1} \cdot \mathrm{clip}\left(\sum_{\mathrm{exc}} w \cdot r^{\mathrm{pre}}(t-d), 0, 1\right), \mathrm{pE}\right)$ $\mathrm{ASP}(t) = \sum_{\mathrm{A\_SP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vFEFvm}$ $\mathrm{AFEAT}(t) = \mathrm{vV24} \cdot \mathrm{pow}\left(\sum_{\mathrm{A\_FEAT}} w \cdot r^{\mathrm{pre}}(t-d), \mathrm{pV24}\right)$ $\mathrm{ALIP}(t) = \sum_{\mathrm{LIP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vLIP}$ $A(t) = \mathrm{AFEAT}(t) + \mathrm{ALIP}(t) + \mathrm{ASP}(t) + 1$ $\mathrm{SFEAT}(t) = \mathrm{pow}\left(\mathrm{vF1} \cdot \mathrm{clip}\left(\sum_{\mathrm{S\_FEAT}} w \cdot r^{\mathrm{pre}}(t-d), 0, 1\right), \mathrm{pF1}\right)$ $\mathrm{SSP}(t) = \sum_{\mathrm{S\_SP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vSP1}$ $\mathrm{SSUR}(t) = \sum_{\mathrm{S\_SUR}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vSUR1}$ $S(t) = E(t) \cdot (A(t) + \mathrm{SFEAT}(t) + \mathrm{SSP}(t) + \mathrm{SSUR}(t))$ $\mathrm{EA}(t) = A(t) \cdot E(t)$ $A_S(t) = \frac{A(t)}{S(t) + \mathrm{sigmaL4}}$ $\mathrm{EA}_S(t) = \frac{A(t) \cdot E(t)}{S(t) + \mathrm{sigmaL4}}$ $\frac{\tau \cdot dr}{\Delta t} = \frac{A(t) \cdot E(t) \cdot \mathrm{gHVA4}}{S(t) + \mathrm{sigmaL4}} - r(t)$

Name	V4L23_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$$\text{ALIP}(t) = \sum_{\text{LIP1}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vLIP1} + \sum_{\text{LIP2}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vLIP2}$$ $$A(t) = \left(\sum_{\text{A\_PFC}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vPFC} + \text{vLIP} \cdot \text{ALIP}(t) + 1\right) \cdot \text{pow}\left(\sum_{\text{exc}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vV42}, \text{pV42}\right)$$ $$S(t) = \left(\sum_{\text{A\_PFC}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vPFC} + \sum_{\text{SSP}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vSSP} + \text{vLIP} \cdot \text{ALIP}(t) + 1\right) \cdot \text{pow}\left(\sum_{\text{exc}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vV42}, \text{pV42}\right)$$ $$\frac{\tau \cdot dr}{\Delta t} = \frac{A(t) \cdot \text{gHVA2}}{S(t) + \text{sigmaL23}} - r(t)$$

Name	FEFv_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$$\text{ALIP}(t) = \sum_{\text{LIP1}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vLIP1} + \sum_{\text{LIP2}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vLIP2}$$ $$E(t) = \sum_{\text{exc}} w \cdot r^{\text{pre}}(t-d) \cdot \text{vExc} + \text{ALIP}(t)$$ $$q(t) = \frac{E(t) \cdot (\text{sigmaFEF} + 1)}{E(t) + \text{sigmaFEF}}$$ $$\frac{\tau \cdot dr}{\Delta t} = -r(t) + (-c + q(t) \cdot (c+1))^{+}$$

Name	FEFvm_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$\mathrm{ES}(t) = \mathrm{clip}\left(\sum_{\mathrm{E\_v}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vEv} - \sum_{\mathrm{S\_v}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vSv1}, 0, 1\right)$ $E(t) = \mathrm{vlow} \cdot \left(\sum_{\mathrm{E\_v}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vEv}\right)^{+} + \mathrm{ES}(t) \cdot (1 - \mathrm{vlow})$ $\frac{\tau \cdot dr}{\Delta t} = \sum_{\mathrm{E\_m}} w \cdot r^{\mathrm{pre}}(t-d) \cdot (1 - \mathrm{vFEFv}) + E(t) \cdot \mathrm{vFEFv} - r(t)$

Name	FEFm_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$\mathrm{svm}(t) = \sum_{\mathrm{vm}} w \cdot r^{\mathrm{pre}}(t-d)$ $\frac{\tau \cdot dr}{\Delta t} = \sum_{\mathrm{vm}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vFEFvm} - \sum_{\mathrm{fix}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{vSFix} - \mathrm{vSvm} \cdot \max\left(\mathrm{svm}(t)\right) - r(t)$

Name	HD_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{CCWturn} \cdot \mathrm{Rotphi} \cdot \mathrm{sum}\left(HDRotCCW\right) + \mathrm{CWturn} \cdot \mathrm{Rotphi} \cdot \mathrm{sum}\left(HDRotCW\right) + \mathrm{HD2HDphi} \cdot \mathrm{sum}\left(HD2HD\right) + \mathrm{cue} \cdot \mathrm{percep}_{\mathrm{flag}} + \mathrm{cue}_{\mathrm{init}} + \mathrm{imag}_{\mathrm{flag}} \cdot \mathrm{oPR2HDphi} \cdot \mathrm{sum}\left(oPR2HD\right) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	IP_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot \left(-\alpha + \sum_{\mathrm{HD2IP}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{HD2IPphi}\right)}}$

Name	H_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot (I_{\mathrm{comp}}(t) + \mathrm{BVC2Hphi} \cdot \mathrm{Pmod} \cdot \mathrm{sum}\,(BVC2H) + \mathrm{Hphi} \cdot \mathrm{sum}\,(H2H) + \mathrm{Imod} \cdot \mathrm{oPR2Hphi} \cdot \mathrm{sum}\,(oPR2H) + \mathrm{OVC2Hphi} \cdot \mathrm{sum}\,(OVC2H) + \mathrm{PR2Hphi} \cdot \mathrm{sum}\,(PR2H)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$ $\frac{dI_{\mathrm{comp}}(t)}{dt} \cdot \mathrm{ICtau} = -\text{nb-neurons-H} \cdot \mathrm{mean}\,(r(t)) + 15$

Name	BVC_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot (\mathrm{H2BVCphi} \cdot \mathrm{Imod} \cdot \mathrm{sum}\,(H2BVC) + \mathrm{OVC2BVCphi} \cdot \mathrm{sum}\,(OVC2BVC) + \mathrm{PR2BVCphi} \cdot \mathrm{sum}\,(PR2BVC) + \mathrm{Pmod} \cdot \mathrm{TR2BVCphi} \cdot \mathrm{sum}\,(TR2BVC) + \mathrm{sum}\,(BVC2BVC)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	PR_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{cue}_{\mathrm{percep}} + \mathrm{use}_{\mathrm{syninput}} \cdot (\mathrm{BVC2PRphi} \cdot \mathrm{sum}\,(BVC2PR) + \mathrm{H2PRphi} \cdot \mathrm{Imod} \cdot \mathrm{sum}\,(H2PR) + \mathrm{sum}\,(PR2PR)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	oPR_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot \left(\sum_{\mathrm{oPR2oPR}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{oPR2oPRphi} + \mathrm{Cue} \cdot \mathrm{recallobj} + \mathrm{H2oPRphi} \cdot \mathrm{sum}\left(H2oPR\right) + \mathrm{OVC2oPRphi} \cdot \mathrm{sum}\left(OVC2oPR\right) + 200 \cdot \mathrm{oPR}_{\mathrm{drive}} \cdot \mathrm{percep}_{\mathrm{flag}} \right) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	PW_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot \left(\sum_{\mathrm{TR2PW}} w \cdot r^{\mathrm{pre}}(t-d) \cdot \mathrm{Imod} \cdot \mathrm{TR2PWphi} + \mathrm{BcueScale} \cdot \mathrm{ego\text{-}cue\text{-}percep} \cdot \mathrm{use\text{-}ego\text{-}cue\text{-}percep} - 100 \cdot \mathrm{bath} \right) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	oPW_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{ObjCue}_{\mathrm{percep}} \cdot \mathrm{OcueScale} + \mathrm{use}_{\mathrm{syninput}} \cdot \left(\mathrm{Imod} \cdot \mathrm{TR2oPWphi} \cdot \mathrm{sum}\left(oTR2oPW\right) - \mathrm{bath} \cdot \mathrm{nb\text{-}neurons\text{-}oPW} \cdot \mathrm{mean}\left(r(t)\right)\right) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	TR_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot (\mathrm{BVC2TRphi} \cdot \mathrm{Imod} \cdot \mathrm{sum}\left(BVC2TR\right) + \mathrm{HD2TRphi} \cdot \mathrm{sum}\left(HD2TR\right) - \mathrm{IP2TRphi} \cdot \mathrm{sum}\left(IP2TR\right) + \mathrm{PW2TRphi} \cdot \mathrm{Pmod} \cdot \mathrm{sum}\left(PW2TR\right) - \mathrm{bath} \cdot \mathrm{sum}\left(TR2TR\right)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	OVC_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot (\mathrm{BVC2OVCphi} \cdot \mathrm{sum}\left(BVC2OVC\right) + \mathrm{H2OVCphi} \cdot \mathrm{Imod} \cdot \mathrm{sum}\left(H2OVC\right) + \mathrm{Imod} \cdot \mathrm{oPR2OVCphi} \cdot \mathrm{sum}\left(oPR2OVC\right) + \mathrm{OVC2OVCphi} \cdot \mathrm{sum}\left(OVC2OVC\right) + \mathrm{Pmod} \cdot \mathrm{TR2OVCphi} \cdot \mathrm{sum}\left(oTR2OVC\right)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	oTR_Neuron
Type	User-defined model of a rate-coded neuron.
Equations	$k(t) = \mathrm{use}_{\mathrm{syninput}} \cdot (\mathrm{HD2oTRphi} \cdot \mathrm{sum}\left(HD2oTR\right) - \mathrm{IP2oTRphi} \cdot \mathrm{sum}\left(IP2oTR\right) + \mathrm{Imod} \cdot \mathrm{OVC2oTRphi} \cdot \mathrm{sum}\left(OVC2oTR\right) + \mathrm{Pmod} \cdot \mathrm{oPW2oTRphi} \cdot \mathrm{sum}\left(oPW2oTR\right) - \mathrm{bath} \cdot \mathrm{sum}\left(oTR2oTR\right)) - \mathrm{act}(t)$ $\frac{d\mathrm{act}(t)}{dt} \cdot \tau = k(t)$ $r(t) = \frac{1}{1 + e^{-2 \cdot \beta \cdot (-\alpha + \mathrm{act}(t))}}$

Name	Convolution operation
Type	Convoluted kernel over the pre-synaptic population.
PSP	$w(t) \cdot r^{\text{pre}}(t-d)$

F	**Parameters**

Population	**Parameter**	**Value**
EP	τ	10.0
	baseline	0.0

Population	**Parameter**	**Value**
X_FEF	A	1.0
	τ	10.0
	w_{inh}	0.2
	X_{FEFsc}	0.2
	num-neurons-w	21
	num-neurons-h	16

Population	**Parameter**	**Value**
LIP_EP	A	1.0
	D	0.1
	τ	10.0
	w_{inh}	0.06
	FFsc	0.35
	FEFsc	0.3
	vSSP	0.01
	num-neurons-w	21
	num-neurons-h	16

Population	**Parameter**	**Value**
LIP_CD	A	0.5
	D	0.1
	τ	10.0
	w_{inh}	0.03
	FBsc	0.75
	FEFsc	0.15
	vSSP	0.4
	num-neurons-w	21
	num-neurons-h	16

Population	Parameter	Value
Xh	D	0.6
	τ	10.0
	$\mathrm{dt}_{\mathrm{dep}}$	1.0
	τ_{dep}	10000.0
	d_{dep}	2.2
	w_{inh}	0.1
	neglect	False
	FFsc	1.2
	NEsc	0.7
	INHsc	1.2
	num-neurons-w	21
	num-neurons-h	16
	baseline	0.0

Population	Parameter	Value
V1	r	0.0

Population	Parameter	Value
AuxV1	pV1C	2.5

Population	Parameter	Value
V4L4	sigmaL4	0.4
	gHVA4	1.066
	τ	10
	vV1	1.0
	vFEFvm	4.0
	vV24	1.0
	pV24	1
	vLIP	1.0
	vF1	3.0
	pF1	3
	pE	1
	vSP1	0.85
	vSUR1	0

Population	Parameter	Value
V4L23	sigmaL23	1.0
	gHVA2	1.55
	τ	10
	pV42	0.25
	vV42	1.0
	vPFC	1.75
	vLIP	1.0
	vLIP1	1.0
	vLIP2	0.1
	vSSP	1.5

Population	Parameter	Value
AuxA		

Population	Parameter	Value
AuxE		

Population	Parameter	Value
FEFv	τ	10
	sigmaFEF	0.1
	c	6
	vExc	0.55
	vLIP1	0.75
	vLIP2	0.1

Population	Parameter	Value
FEFvm	τ	10
	vlow	0.2
	vEv	0.6
	vSv1	0.6
	vFEFv	1.0

Population	Parameter	Value
FEFm	τ	65
	vFEFvm	1.0
	vSvm	0.3
	vSFix	3

Population	Parameter	Value
FEFfix	r	0.0

Population	Parameter	Value
PFC	r	0.0

Population	**Parameter**	**Value**
HD	τ	20.0
	β	0.1
	α	5.0
	HD2HDphi	15.0
	oPR2HDphi	60.0
	cue	0.0
	cue_{init}	0.0
	$\text{percep}_{\text{flag}}$	1.0
	$\text{imag}_{\text{flag}}$	0.0
	Rotphi	4.0
	CWturn	0.0
	CCWturn	0.0

Population	**Parameter**	**Value**
BVC	τ	20.0
	β	0.1
	α	5.0
	Pmod	0.05
	Imod	0.05
	H2BVCphi	2860.0
	OVC2BVCphi	0.0
	TR2BVCphi	30.0
	PR2BVCphi	3.0
	$\text{use}_{\text{syninput}}$	0.0

Population	**Parameter**	**Value**
PR	τ	20.0
	β	1.0
	α	5.0
	Pmod	0.05
	Imod	0.05
	H2PRphi	6000.0
	BVC2PRphi	75.0
	$\text{use}_{\text{syninput}}$	0.0
	$\text{cue}_{\text{percep}}$	0.0

Population	Parameter	Value
oPR	τ	20.0
	β	0.1
	α	5.0
	Pmod	0.05
	Imod	0.05
	oPR2oPRphi	115.0
	H2oPRphi	1.0
	OVC2oPRphi	5.0
	$\text{use}_{\text{syninput}}$	0.0
	$\text{percep}_{\text{flag}}$	1.0
	recallobj	0.0
	$\text{oPR}_{\text{drive}}$	0.0
	Cue	0.0

Population	Parameter	Value
PW	τ	20.0
	β	0.1
	α	5.0
	BcueScale	1.6
	Pmod	0.05
	Imod	0.05
	TR2PWphi	35.0
	bath	0.165
	use-ego-cue-percep	0.0
	ego-cue-percep	0.0
	$\text{use}_{\text{syninput}}$	0.0

Population	Parameter	Value
H	τ	20.0
	β	0.1
	α	5.0
	ICtau	20.0
	nb-neurons-H	1936.0
	Pmod	0.05
	Imod	0.05
	Hphi	25.0
	BVC2Hphi	437.0
	PR2Hphi	25.0
	OVC2Hphi	5.0
	oPR2Hphi	100.0
	$\text{use}_{\text{syninput}}$	0.0

Population	Parameter	Value
TR	τ	20.0
	β	0.1
	α	5.0
	Pmod	0.05
	Imod	0.05
	bath	0.075
	HD2TRphi	15.0
	IP2TRphi	90.0
	PW2TRphi	50.0
	BVC2TRphi	45.0
	$use_{syninput}$	0.0

Population	Parameter	Value
IP	α	50.0
	β	0.1
	τ	20.0
	HD2IPphi	10.0

Population	Parameter	Value
oPW	τ	20.0
	β	0.1
	α	5.0
	OcueScale	0.3
	nb-neurons-oPW	816.0
	Pmod	0.05
	Imod	0.05
	TR2oPWphi	30.0
	bath	0.2
	$use_{syninput}$	0.0
	$ObjCue_{percep}$	0.0

Population	Parameter	Value
OVC	τ	20.0
	β	0.1
	α	5.0
	Pmod	0.05
	Imod	0.05
	H2OVCphi	2.1
	TR2OVCphi	60.0
	OVC2OVCphi	1.0
	BVC2OVCphi	0.0
	oPR2OVCphi	7.2
	$use_{syninput}$	0.0

Population	**Parameter**	**Value**
oTR	τ	20.0
	β	0.1
	α	5.0
	Pmod	0.05
	Imod	0.05
	bath	0.1
	HD2oTRphi	15.0
	IP2oTRphi	90.0
	oPW2oTRphi	60.0
	OVC2oTRphi	110.0
	$\mathrm{use}_{\mathrm{syninput}}$	0.0