

1. Parameters' tables

Table superscript references: **1**: Bugaysen et al. (2010), **2**: Baufreton (2005), **3**: Beurrier et al. (1999), **3**: Connelly et al. (2010), **4**: Dayan and Abbott (2001), **5**: Fountas (2016), **6**: Galarreta and Hestrin (1997), **7**: Humphries et al. (2010), **8**: Humphries (2009), **9**: Humphries et al. (2009), **10**: Humphries, in code., **11**: Izhikevich (2007), **12**: Lindahl et al. (2013), **13**: Loucif et al. (2008), **14**: Moyer et al. (2007), **15**: Mahon (2000), **16**: Oorschot (1996), **17**: Richards et al. (1997), **18**: Tomkins et al. (2014), **19**: Tateno and Robinson (2011), *: Manually tuned. ★: Local search.

Connection	Receptor	Connection type	Probability	λ	G	E	τ
Ctx \rightarrow MSN	AMPA	One-to-one		10.0 ⁵	6.1 ⁹	0.0 ^{18,14}	6.0 ¹⁸
	NMDA	One-to-one		10.0 ⁵	3.05 ⁹	0.0 ^{18,14}	160.0 ¹⁸
MSN \rightarrow MSN	GABAA	All-to-all	0.32 ¹⁸	<i>uniform</i> (1.0, 2.0) ¹⁰	0.25 *	-60.0 ^{18,14}	11.0 ⁶
MSN \rightarrow SNr	GABAA	All-to-all	0.033 ⁵	1.0 ⁵	57.66 ★	-80.0 ^{5,4}	5.2 ^{5,3,12}
SNr \rightarrow SNr	GABAA	All-to-all	0.1 ⁵	1.0 ⁵	0.3254 ★	-80.0 ^{5,4}	3.0 ^{5,4}
Ctx \rightarrow STN	AMPA	One-to-one		2.5 ⁵	0.0215 *	0.0 ^{5,4}	2.0 ^{5,4}
	NMDA	One-to-one		2.5 ⁵	$\times 0.6$ ⁵	0.0 ^{5,4}	100.0 ^{5,4}
STN \rightarrow GPe	AMPA	All-to-all	0.3 ⁵	2.0 ⁵	0.3 *	0.0 ^{5,4}	2.0 ^{5,4}
	NMDA	All-to-all	0.3 ⁵	2.0 ⁵	$\times 0.36$ ⁵	0.0 ^{5,4}	100.0 ^{5,4}
GPe \rightarrow STN	GABAA	All-to-all	0.1 ⁵	4.0 ⁵	0.518 ⁵	-84.0 ^{5,2,12}	8.0 ^{5,2,12}
GPe \rightarrow GPe	GABAA	All-to-all	0.1 ⁵	1.0 ⁵	0.765 ⁵	-65.0 ^{5,12}	5.0 ^{5,12}
MSN \rightarrow GPe	GABAA	All-to-all	0.033 ⁵	5.0 ⁵	10.0 *	-65.0 ^{5,12}	6.0 ^{5,12}
STN \rightarrow SNr	AMPA	All-to-all	0.3 ⁵	1.5 ⁵	3.392 ★	0.0 ^{5,4}	2.0 ^{5,4}
	NMDA	All-to-all	0.3 ⁵	1.5 ⁵	$\times 0.2$ ⁵	0.0 ^{5,4}	100.0 ^{5,4}
GPe \rightarrow SNr	GABAA	All-to-all	0.1066 ⁵	3.0 ⁵	59.672 ★	-80.0 ^{5,4}	2.1 ^{5,3,12}

Table 1: Synaptic and connectivity parameters.

Parameter	MSN D1	MSN D2
N	$1146^{18,7}$	$1146^{18,7}$
C	$15.0^{18,8}$	$15.0^{18,9}$
k	$1.0^{18,11}$	$1.0^{18,11}$
v_t	$-30.0^{18,8}$	$-30.0^{18,8}$
v_r	$-80.0^{18,11}$	$-80.0^{18,11}$
v_{peak}	$40.0^{18,11}$	$40.0^{18,11}$
a	$0.01^{18,15,11}$	$0.01^{18,15,11}$
b	$-20.0^{18,11}$	$-20.0^{18,11}$
c	$-55.0^{18,11}$	$-55.0^{18,11}$
d	$91.0^{18,11}$	$91.0^{18,11}$
I_{F-I}	25.0^*	25.0^*
I_{sim}	0.0^{18}	0.0^{18}
ϕ_1	$0.3^{18,9}$	$0.3^{18,9}$
ϕ_2	$0.3^{18,9}$	$0.3^{18,9}$
β_1	6.3^8	6.3^8
β_2	0.215^8	0.215^8
α	$0.0^{18,8}$	$0.032^{18,8}$
K	$0.0289^{18,8}$	$0.0^{18,8}$
L	$0.331^{18,8}$	$0.0^{18,8}$

Table 2: MSN parameters.

Parameter	STN RB	STN LLRS	STN NR
N	28 ^{5,16}	12 ^{5,16}	7 ^{5,16}
C	23.0 ⁵	40.0 ⁵	30.0 ⁵
k	0.439 ⁵	0.3 ⁵	0.105 ⁵
v_t	-41.4 ^{5,3}	-50.0 ^{5,3}	-43.75 ^{5,3}
v_r	-56.2 ^{5,13}	-56.2 ^{5,13}	-58.5 ^{5,13}
v_{peak}	15.4 ^{5,3}	15.4 ^{5,3}	15.4 ^{5,3}
a_1	0.021 ⁵	0.05 ⁵	0.44 ⁵
b_1	4.0 ⁵	0.2 ⁵	-1.35 ⁵
c	-47.7 ⁵	-60.0 ⁵	-52.34 ⁵
d_1	17.1 ⁵	1.0 ⁵	17.65 ⁵
I_{F-I}	56.1 ⁵	25.0 ⁵	-1.0 ⁵
I_{sim}	56.1 ⁵	8.0 ⁵	-18.0 ⁵
a_2	0.123 ⁵	0.001 ⁵	0.32 ⁵
b_2	0.015 ⁵	0.3 ⁵	3.13 ⁵
d_2	-68.4 ⁵	10.0 ⁵	92.0 ⁵
v_{r2}	-60.0 ⁵	-60.0 ⁵	-43.2 ⁵
w_1	0.1 ⁵	0.01 ⁵	0.001 ⁵
w_2	0.0 ⁵	0.0 ⁵	1.0 ⁵

Table 3: STN parameters.

Parameter	GPe A	GPe B	GPe C	SNr
N	7 ^{5,16}	131 ^{5,16}	17 ^{5,16}	3000 *
C	55.0 ⁵	68.0 ⁵	57.0 ⁵	172.1 ⁵
k	0.06 ⁵	0.943 ⁵	0.099 ⁵	0.7836 ⁵
v_t	-42.0 ^{5,1}	-44.0 ^{5,1}	-43.0 ^{5,1}	-51.8 ^{5,17}
v_r	-50.7 ^{5,1}	-53.0 ^{5,1}	-54.0 ^{5,1}	-64.58 ^{5,19}
v_{peak}	38.0 ^{5,1}	25.0 ^{5,1}	34.5 ^{5,1}	9.8 ^{5,17}
a	0.29 ⁵	0.0045 ⁵	0.42 ⁵	0.113 ⁵
b	4.26 ⁵	3.895 ⁵	7.0 ⁵	11.057 ⁵
c	-57.4 ⁵	-58.36 ⁵	-52.0 ⁵	-62.7 ⁵
d	110.0 ⁵	0.353 ⁵	166.0 ⁵	138.4 ⁵
I_{F-I}	107.0 ⁵	52.0 ⁵	187.5 ⁵	150.0 ⁵
I_{sim}	167.0 ⁵	64.0 ⁵	237.5 ⁵	690.4 *

Table 4: GPe and SNr neurons parameters.

2. References

References

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