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| Nomenclature as in the manuscript | Nomenclature as in the Matlab codes | Remarks |
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|  | J55e | DRN's Glutamatergic neuronal excitatory coupling on 5-HT neurons |
|  | J5di | VTA's GABAergic neuronal inhibitory coupling on 5-HT neurons |
|  | J55i | DRN's GABAergic neuronal inhibitory coupling on 5-HT neurons |
|  | wi4 | Connection weight from DA pop in VTA to 5-HT in DRN |
|  | Jd5e | DRN's Glutamatergic neuronal excitatory coupling on DA neurons |
|  | Jdi | VTA's GABAergic neuronal inhibitory coupling on DA neurons |
|  | wi3 | Connection weight from 5-HT in DRN to DA pop in VTA |
|  | w5e1 | Connection weight from 5-HT neural pop to Glu pop in DRN, relative to 5-HT-to-DA connection |
|  | wi1 | Connection weight from 5-HT in DRN to GABA pop in VTA |
|  | wi2 | Connection weight from DA in VTA to GABA pop in VTA |
|  | w5i1 | Connection weight from 5-HT to GABA pop in DRN, relative to 5-HT-to-DA |
|  | w5i2 | Connection weight from DA in VTA to GABA in DRN, relative to DA-to-5-HT |
|  | w5ee | Self-inhibition of Glutamatergic population in DRN |
|  | w5ii | Self-inhibition of GABAergic population in DRN |
|  | Jd5 | VTA's GABAergic neuronal inhibitory coupling on DRN's GABA |
|  | wii | Self-inhibition of GABAergic population in VTA |
|  | wdd | Self-inhibition of DA population in VTA |
|  | w55 | Self-inhibition of 5HT population in DRN |
|  | g\_5 | Input-output function gain parameter for serotonin |
|  | I5 | Total input current to 5-HT |
|  | I\_05 | Threshold current for input-output function of 5-HT |
|  | F5 | Threshold linear input-output function of 5-HT |
|  | F | Threshold linear input-output function of DA |
|  | g\_d | Input-output function gain parameter for DA |
|  | I | Total input current to DA |
|  | I\_0 | Threshold current for input-output function of DA |
|  | F5e | Threshold linear input-output function of Glu |
|  | g\_5e | Input-output function gain parameter for Glu |
|  | I5e | Total input current to Glu |
|  | I\_05e | Threshold current for input-output function of Glu |
|  | F5i | Threshold linear input-output function of GABA-DRN |
|  | g\_5i | Input-output function gain parameter for GABA-DRN |
|  | I5i | Total input current to GABA-DRN |
|  | I\_05i | Threshold current for input-output function of GABA-DRN |
|  | Fi | Threshold linear input-output function of GABA-VTA |
|  | g\_di | Input-output function gain parameter for GABA-VTA |
|  | Ii | Total input current to GABA-VTA |
|  | I\_0i | Threshold current for input-output function of GABA-VTA |
|  | I\_ad | VTA's adaptive current in DA |
|  | I\_app | External excitatory input to DA |
|  | I\_ad5 | DRN’s adaptive current in 5-HT |
|  | I\_app5 | External excitatory input to 5-HT |
|  | I\_app5i | External excitatory input to GABA-DRN |
|  | I\_appe | External excitatory input to Glu |
|  | I\_appi | External excitatory input to GABA-VTA |
|  | tau\_5\_auto | Time constant of 5-HT autoreceptor induced current |
|  | k\_a5 | Conversion factor from [5-HT] to 5-HT-induced current, fit to adjust 5-HT firing and [5-HT] baselines |
|  | s | concentration of 5-HT in DRN |
|  |  | Time constant of DA autoreceptor induced current |
|  | k\_ad | Conversion factor from [DA] to DA-induced current, fit to baseline concentration |
|  | d | concentration of DA in VTA |
|  | tau\_d5 | Time constant in ms for 5-HT induced current on DA neurons |
|  | Ad5 | Conversion from [5-HT] to 5-HT receptor induced current for DA neurons |
|  | Id5 | Current due to 5-HT receptors in DA |
|  | tau\_5d | Time constant in ms for DA induced current on 5-HT neurons |
|  | I5d | Current due to DA receptors in 5-HT |
|  | A5d | Conversion from [DA] to DA receptor induced current for 5-HT neurons |
|  | Vmax5 | Maximal reuptake [5-HT] |
|  | Cp5 | concentration release due to 5-HT neuronal firing rate |
|  | Km5 | Half max reuptake [5-HT] microM (per litre) |
|  | Cp | concentration release due to DA neuronal firing rate |
|  | Vmax | Maximal reuptake [DA] |
|  | Km | Half max reuptake [DA] microM (per litre) |