1 Symbols and Modeling Values

1.1 List of Important Notations

$a \in \mathbb{R}$	degree of symmetry in construction of asymmetric RNNs in eq.(**??**)
$\beta_s \in \mathbb{R}$	trial-to-trial correlation defined in rq.(**??**)
$\beta \in \mathbb{R}$	parameter that defines the dimensionality in construction of covariance matrix for input. In varies contexts, there are β_{dim}, β_{spont}, and β_{Low} with $\beta_{\text{Low}} < \beta_{\text{dim}} < \beta_{\text{spont}}$.
$\bar{c}(\Delta\tilde{t}) \in \mathbb{R}$	intra-trial stability defined in eq.(**??**)
$d_{\text{eff}} \in \mathbb{R}$	the linear effective dimensionality defined in eq.(**??**). $d_{\text{eff, ana}}$ is the analytical formulation and $d_{\text{eff, emp}}$ the empirical for effective dimensionality
$\gamma \in \mathbb{R}$	the alignment of evoked activity to spontaneous activity
$h \in \mathbb{R}^{n\times 1}$	mean firing rates feedforward inputs to recurrent network. If not otherwise defined in contexts, characterizing generally the feedforward inputs.
$\tilde{h} \in \mathbb{R}^{n\times 1}$	feedforward inputs with modifications mentioned in section **??**
$I_n \in \mathbb{R}^{n\times n}$	identity matrix
$J \in \mathbb{R}^{n\times n}$	interaction matrix for recurrent network
$n \in \mathbb{R}$	number of neurons in recurrent network
$N \in \mathbb{R}$	number of trials
$r \in \mathbb{R}^{n\times 1}$	response from recurrent network
$r^* \in \mathbb{R}^{n\times 1}$	steady state response from recurrent network determined by (**??**)
$R \in \mathbb{R}$	radius for eigenvalue distribution
$\sigma_{\text{trial}} \in \mathbb{R}$	variance constant for trial-to-trial correlation
$\sigma_{\text{time}} \in \mathbb{R}$	variance constant for intra-trial stability
$\Sigma \in \mathbb{R}^{n\times n}$	covariance matrix for input patterns. There are Σ^{Dim}, Σ_{spont}, and Σ_{Low} for different contexts.
$\nu \in \mathbb{R}$	feedforward recurrent alignment score
$\nu^* \in \mathbb{R}^{n\times 1}$	steady state for feedforward recurrent interaction during Hebbian learning of feedforward interaction
$W \in \mathbb{R}^{n\times 1}$	feedforward interaction matrix (vector) for feedforward recurrent network in section **??**
$0_v \in \mathbb{R}^{n\times 1}$	zero vector in length of number of neurons n
$\rho \in \mathbb{R}$	projection ratio

1.2 Modeling Values

Notations	Values
n	200
R	0.85
τ_r	1
σ_{trial}	0.05
σ_{time}	0.3
M_{dim}	50
M_{spont}	100
Δt	0.1
$\Delta \tilde{t}$	20
T	120
N	500
β_{Low}	5
κ	5
β_{dim}	10
β_{spont}	20
M_{Low}	25
T_{Hebb}	50