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| Title:                  | Imbalance of positive and negative links induces regularity  |
| Authors:                | Sinha, Sudeshna (/jspui/browse?type=author&value=Sinha%2C+Sudeshna)  |
| Keywords:               | Chaotic nature<br>Connection weights<br>Dynamical networks   |
| Issue Date:             | 2011   |
| Publisher:              | Elsevier Ltd   |
| Citation:               | Chaos, Solitons and Fractals, 44 (1-3), pp. 71-78.   |
| Abstract:               | We investigate the effect of the interplay of positive and negative links, on the dynamical regularity of a random weighted network, with neuronal dynamics at the nodes. We investigate how the mean $J$ and the variance of the weights of links, influence the spatiotemporal regularity of this dynamical network. We find that when the connections are predominantly positive (i.e. the links are mostly excitatory, with $J > 0$ ) the spatiotemporal fixed point is stable. A similar trend is observed when the connections are predominantly negative (i.e. the links are mostly inhibitory, with $J < 0$ ). However, when the positive and negative feedback is quite balanced (namely, when the mean of the connection weights is close to zero) one observes spatiotemporal chaos. That is, the balance of excitatory and inhibitory connections preserves the chaotic nature of the uncoupled case. To be brought to an inactive state one needs one type of connection (either excitatory or inhibitory) to dominate. Further we observe that larger network size leads to greater spatiotemporal regularity. We rationalize our observations through mean field analysis of the network. Karanam, S. Dev and A. R. Choudhury Crystal Growth & Design, 12(1), 240-252 (2012). dynamics. © 2010 Elsevier Ltd. All rights reserved. |
| Description:            | Only IISERM authors are available in the record.   |
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