Nonlinear Sciences > Adaptation and Self-Organizing Systems

Optimal Synchronization in Space

Markus Brede

(Submitted on 27 Jan 2010)

In this Rapid Communication we investigate spatially constrained networks that realize optimal synchronization properties. After arguing that spatial constraints can be imposed by limiting the amount of `wire' available to connect nodes distributed in space, we use numerical optimization methods to construct networks that realize different trade-offs between optimal synchronization and spatial constraints. Over a large range of parameters such optimal networks are found to have a link length distribution characterized by power law tails $P(l)\propto l^{-\alpha}$, with exponents α increasing as the networks become more constrained in space. It is also shown that the optimal networks, which constitute a particular type of small world network, are characterized by the presence of nodes of distinctly larger than average degree around which long distance links are centred.

Subjects:	**Adaptation and Self-Organizing Systems (nlin.AO)**; Chaotic Dynamics (nlin.CD); Pattern Formation and Solitons (nlin.PS)
Cite as:	**arXiv:1001.4921v1 [nlin.AO]**

Submission history

From: Markus Brede [view email]
[v1] Wed, 27 Jan 2010 12:22:07 GMT (56kb)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.

Download:

- PDF
- PostScript
- Other formats

Current browse context:
nlin.AO
< prev | **next >**
new | recent | 1001

Change to browse by:

nlin
　nlin.CD
　nlin.PS

References & Citations

- CiteBase

Bookmark(what is this?)