

General Relativity and Quantum Cosmology

The Scalar Curvature of a Causal Set

Dionigi M.T. Benincasa, Fay Dowker

(Submitted on 15 Jan 2010 (v1), last revised 16 Jan 2010 (this version, v2))

A one parameter family of retarded linear operators on scalar fields on causal sets is introduced. When the causal set is well-approximated by 4 dimensional Minkowski spacetime, the operators are Lorentz invariant but nonlocal, are parametrised by the scale of the nonlocality and approximate the continuum scalar D'Alembertian, \Box , when acting on fields that vary slowly on the nonlocality scale. The same operators can be applied to scalar fields on causal sets which are well-approximated by curved spacetimes in which case they approximate $\Box - \frac{1}{2}R$ where R is the Ricci scalar curvature. This can be used to define an approximately local action functional for causal sets.

Comments: 4 pages

Subjects: **General Relativity and Quantum Cosmology (gr-qc)**; High Energy Physics - Theory (hep-th)Cite as: **arXiv:1001.2725v2 [gr-qc]**

Submission history

From: Dionigi Benincasa Mr [view email]

[v1] Fri, 15 Jan 2010 16:10:27 GMT (11kb)**[v2]** Sat, 16 Jan 2010 12:57:31 GMT (11kb)*Which authors of this paper are endorsers?*

Download:

- [PostScript](#)
- [PDF](#)
- [Other formats](#)

Current browse context:

gr-qc[< prev](#) | [next >](#)[new](#) | [recent](#) | [1001](#)

Change to browse by:

[hep-th](#)

References & Citations

- [SLAC-SPIRES HEP](#)
([refers to](#) | [cited by](#))
- [CiteBase](#)

Bookmark (what is this?)

- [CiteULike logo](#)
- [Connotea logo](#)
- [BibSonomy logo](#)
- [Mendeley logo](#)
- [Facebook logo](#)
- [del.icio.us logo](#)
- [Digg logo](#)
- [Reddit logo](#)