
PAPER

Euler tours and unicycles in the rotor-router model

V S Poghosyan¹ and V B Priezzhev²

Published 9 June 2014 • © 2014 IOP Publishing Ltd

Journal of Statistical Mechanics: Theory and Experiment, Volume 2014, June 2014

Citation V S Poghosyan and V B Priezzhev *J. Stat. Mech.* (2014) P06003

vpoghos@theor.jinr.ru

¹ Department of Automata Theory and Applications, Institute for Informatics and Automation Problems NAS of Armenia, 0014 Yerevan, Armenia

² Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Russia


Received 15 January 2014

Accepted 11 April 2014

Published 9 June 2014

<https://doi.org/10.1088/1742-5468/2014/06/P06003>

Buy this article in print

 Journal RSS

Sign up for new issue notifications

Create citation alert

Abstract.

A recurrent state of the rotor-routing process on a finite sink-free graph can be represented by a unicycle that is a connected spanning subgraph containing a unique directed cycle. We distinguish between short cycles of length 2 called 'dimers' and longer ones called 'contours'. Then the rotor-router walk performing an Euler tour on the graph generates a sequence of dimers and contours which exhibits both random and regular properties. Imposing initial conditions randomly chosen from the uniform distribution we calculate expected numbers of dimers and contours and correlation between them at two successive moments of time in the sequence. On the other hand, we prove that

the excess of the number of contours over dimers is an invariant depending on planarity of the subgraph but not on initial conditions. In addition, we analyze the mean-square displacement of the rotor-router walker in the recurrent state.

Export citation and abstract

[BibTeX](#)

[RIS](#)

◀ **Previous** article in issue

Next article in issue ▶

Access this article

The computer you are using is not registered by an institution with a subscription to this article. Please choose one of the options below.

Login

Access through your institution

IOPscience login

Find out more about journal subscriptions at your site.

Purchase from

Article Galaxy

CCC RightFind

Purchase this article from our trusted document delivery partners.

Rent from



This article is available from DeepDyve.

Make a recommendation

To gain access to this content, please complete the Recommendation Form and we will follow up with your librarian or Institution on your behalf.

For corporate researchers we can also follow up directly with your R&D manager, or the information management contact at your company. Institutional subscribers have access to the current volume, plus a 10-year back file (where available).

Related content

JOURNAL ARTICLES

A loop reversibility and subdiffusion of the rotor-router walk

Spiral structures in the rotor-router walk

Perfect boundaries in rotor-router aggregation on cylinders

Rotor-router walk on a semi-infinite cylinder

Proportionate growth in patterns formed in the rotor-router model

Logarithmic conformal invariance in the Abelian sandpile model