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T-systems with boundaries from network solutions. (English) Zbl 1266.05176
Electron. J. Comb. 20, No. 1, Research Paper P3, 62 p. (2013).

Summary: In this paper, we use the network solution of the A_rT -system to derive that of the unrestricted $A_\infty T$ -system, equivalent to the octahedron relation. We then present a method for implementing various boundary conditions on this system, which consists of picking initial data with suitable symmetries. The corresponding restricted T -systems are solved exactly in terms of networks. This gives a simple explanation for phenomena such as the Zamolodchikov periodicity property for T -systems (corresponding to the case $A_\ell \times A_r$) and a combinatorial interpretation for the positive Laurent property for the variables of the associated cluster algebra. We also explain the relation between the T -system wrapped on a torus and the higher pentagram maps of *M. Gekhtman et al.* [Electron. Res. Announc. Math. Sci. 19, 1–17 (2012; Zbl 1278.37047)].

MSC:

- 05E10 Combinatorial aspects of representation theory
- 05C22 Signed and weighted graphs
- 82B20 Lattice systems (Ising, dimer, Potts, etc.) and systems on graphs arising in equilibrium statistical mechanics

Cited in **9** Documents

Keywords:

discrete integrable systems; cluster algebra; network solution; octahedron relation; boundary conditions; Zamolodchikov periodicity property; positive Laurent property

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