

T-systems, Y-systems, and cluster algebras

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In 90's the systems of discrete functional equations called T-systems and Y-systems were introduced and studied in the Bethe ansatz method for integrable models. After the introduction of cluster algebras by Fomin and Zelevinsky around 2000 it has been gradually recognized that T-systems and Y-systems are a part of cluster algebra structure. In particular the long standing conjecture of periodicities of Y-systems by Zamolodchikov et al. is proved by the tropicalization method in cluster algebras. One can associate classical and quantum dilogarithm identities with any period of a cluster algebra. As a further consequence, the long standing conjecture of the central charge identities in conformal field theory by Kirillov et al. is proved.