

GEOMETRIC TOMOGRAPHY IN A GRAPH

PAOLO DULIO

ABSTRACT. Motivation for this paper comes from considering that some typical problems in Geometric Tomography can be transferred to the class \mathcal{G} of all graphs. We first introduce in \mathcal{G} the corresponding notion of line through a point, which allow us to deal with (point) X -rays in a graph $G \in \mathcal{G}$. Uniqueness and equichordal problems are discussed in the classes $\mathcal{T} \subset \mathcal{G}$ and $\mathcal{C} \subset \mathcal{T}$ of all trees and of all caterpillars, respectively. A central role is played by path-congruences, namely bijections between two graphs preserving the X -rays. These can be explored both from a global and from a local point of view. The construction in \mathcal{T} of pairs of non isomorphic trees related by a global path-congruence shows that these bijections are a non-trivial generalization of isomorphisms of graph. The local approach is employed in \mathcal{C} , and leads to equichordal vertices in different caterpillars, connecting which one obtains a tree with a pair of equichordal vertices.

A possible application of the equichordal property is discussed.

PAOLO DULIO, DIPARTIMENTO DI MATEMATICA “F. BRIOSCHI”, POLITECNICO
DI MILANO, PIAZZA LEONARDO DA VINCI 32, I-20133 MILANO
E-mail address: paodul@mate.polimi.it