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Some Transformation on Tangle Hyper Graph

H. El-Zohny*, S.Radwan* and Z.M.Hagrass*

** Mathematics Depart, Al-Azhar University' Egypt.*

Abstract

In this paper we introduce some geometric transformations on tangle hyper graph and hyper tangle graph such as retraction, collapse, effect of time, un tangle and deformation, to obtain tangle or hyper graph. We will introduce some apply some application on DNA .

Key words: Retraction, collapse, deformation and untangle.

Mathematics Subject Classification: 51H10, 57H10

Definition 1:

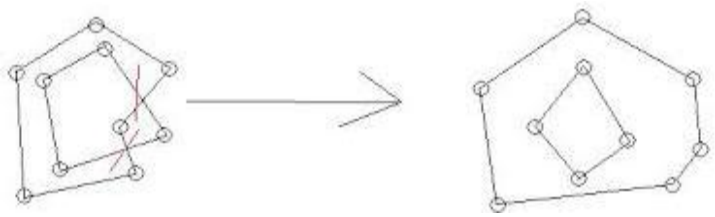
Retracts: A sub set A of topological space X is called " retract" if there exists a continuous map $R : X \to A$ (called a retraction) such that R(a) =a for all $a \in A$ where A is closed [1,2,3].

Definition 2:

Collapse: A tree with at least one edge always has non linear edge removing anon linear edge e of a graph together with free vertices of e is called an elementary collapse, and a sequences of these is called collapse [4].

Definition 3:

Un tangle: A straight-line drawing d of a planar graph G need not be plane but can be made so by untangling it, that is, by moving some of the vertices of G. Let shift (G,d) denote the minimum number of vertices that need to be moved to untangle d [5].



Definition 4:

Deformation: refers to any changes in the shape or size of an object due to an applied force (the deformation energy in this case is transferred through work) or external load or chemical reaction ect. Deformation is often described as strain [6].

Main results:

Retraction of tangle hyper graph (delete vertex from hyper edge(n>1) from either top or bottum and fiber still but continuous reduce until we obtain braid.

Case 1:

Retraction of inner vertices:

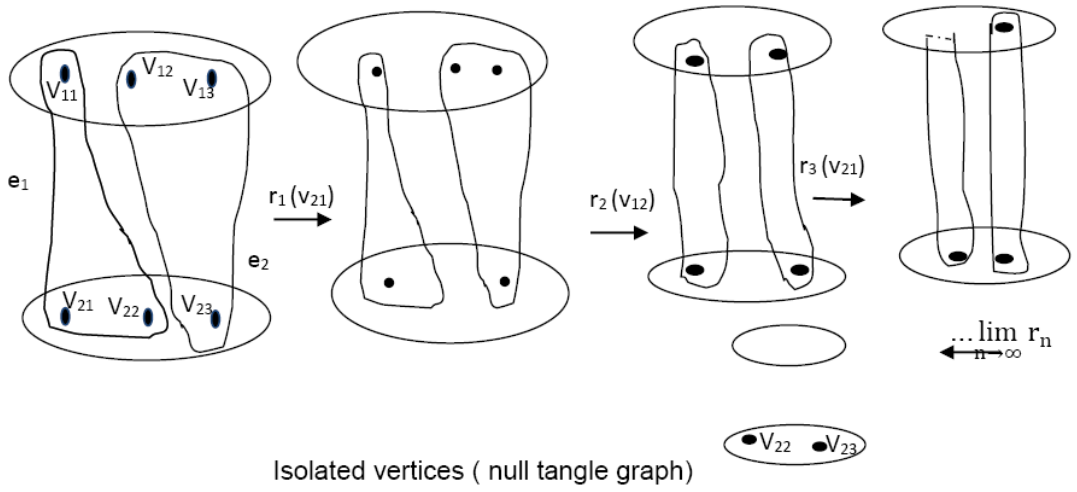


Figure 1

In fig. (1): The inner retraction of vertices of tangle hyper graph lead to delete vertices not fiber as (r_1). In graph delete the vertices and the edge reduce until finish, but in the case (tangle hyper graph) after retraction of vertices the fiber still contains more than one vertex. So we apply retraction again on inner vertices until we obtain simple fiber (braid). Limit of retraction when (n) tends to infinity leads to null tangle graph (Isolated vertices of tangle graph).

Example 1:

Retraction of hyper tangle graph (hyper graph with tangle vertices):

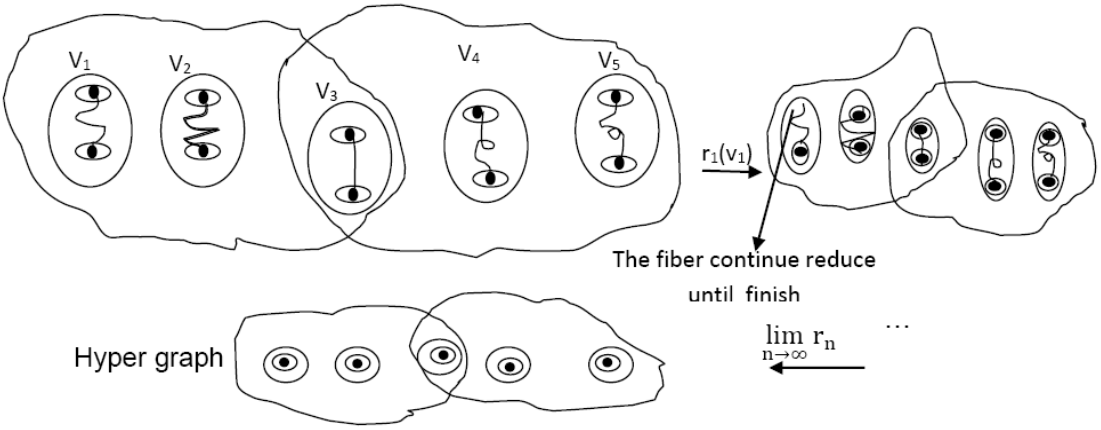


Figure 2

In fig.(2): Inner retraction of hyper tangle graph lead to delete the vertices and the fiber continues to decrease as (r_1). The limit of retraction when (n) tends to infinity lead to hyper graph.

Proposition 1:

The inner retraction of either tangle hyper graph or hyper tangle graph give us the original graph (either tangle or hyper graph).

Case 2:

Retraction of fiber: Delete fiber with its vertices.

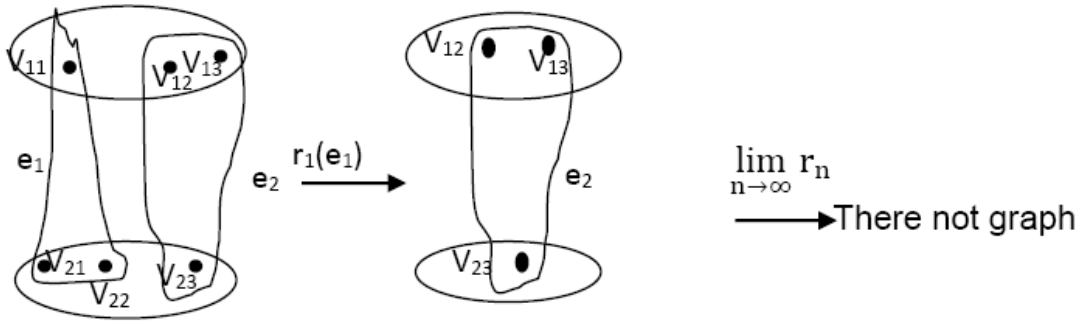


Figure 3

In fig.(3): The retraction of fibers lead to delete the fiber with bits vertices as (r_1). The limit of retraction when (n) tends to infinity lead to there not graph.

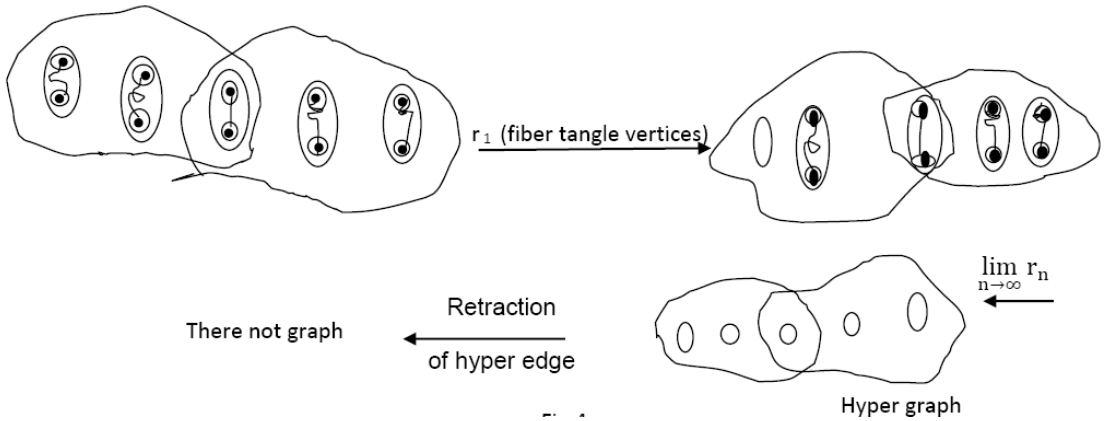


Figure 4

Proposition 2:

The retraction of hyper edge of hyper tangle graph lead to the same result of retraction of fiber of tangle hyper graph both are give there no graph.

Collapse: Delete the vertex with its edge.

Case 1:

Inner collapse of tangle hyper graph:

In fig.(5) : The collapse of inner vertices of tangle hyper graph as(v_{11}) lead to delete the edge which contain the vertex (v_{11}) as ($C_{in(1)}$ and continue this transformation, the limit of collapse when (n) tends to infinity lead to isolated vertices (null tangle graph).

Note:

The collapse is special case of retraction.

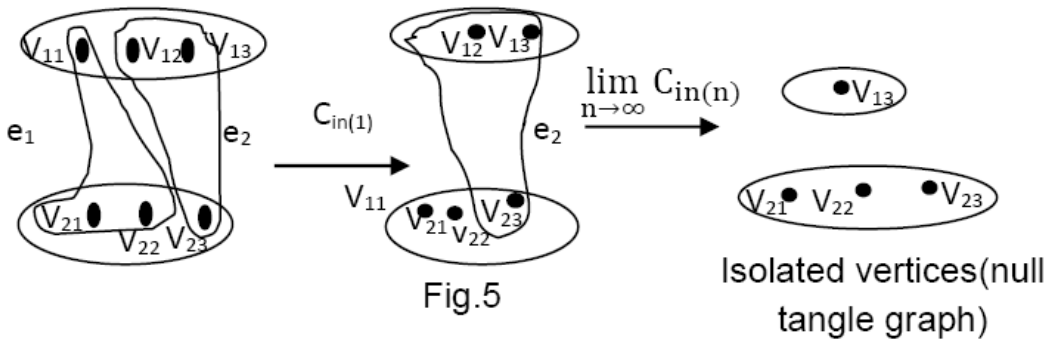


Fig.5

Case 2:

Collapse of hyper tangle graph:

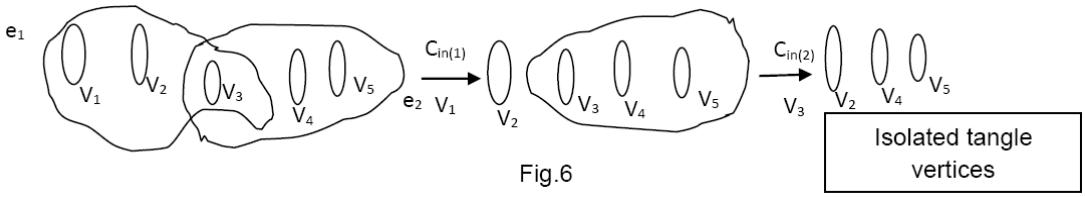


Fig.6

In fig.(6) we can obtain simple vertices by applying either collapse or retraction on tangle vertices and also we obtain the same result by folding.

Case 3:

Collapse of inner hyper tangle graph:

In this case we collapse the inner tangle vertices by deleting inner vertex with its fiber and continue this operation for all tangle vertices. Finally we obtain hyper graph.

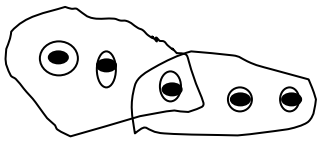


Figure 7

Proposition 3:

The retraction of inner vertices of tangle graph and collapse of inner vertices of the same graph give the same result (null tangle graph i.e. isolated vertices).

Effect of time:

Due to effect of time may be converted the tangle hyper graph into tangle graph and hyper tangle graph into hyper graph.

Example:

The particle of chemical material can move from position and reaction with another and give us one as see in the figure:

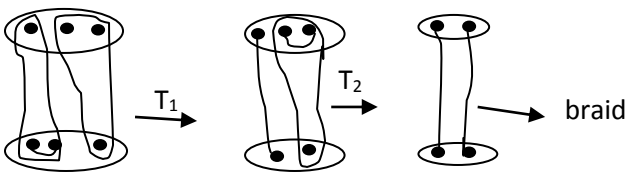


Figure 8

Note:

We can obtain hyper graph by effect of time.

Un tangle (transposition of vertices until we don't find tangle graph or overlap) **:**

Untangle of tangle graph:

Case 1: transposition the outer vertices.

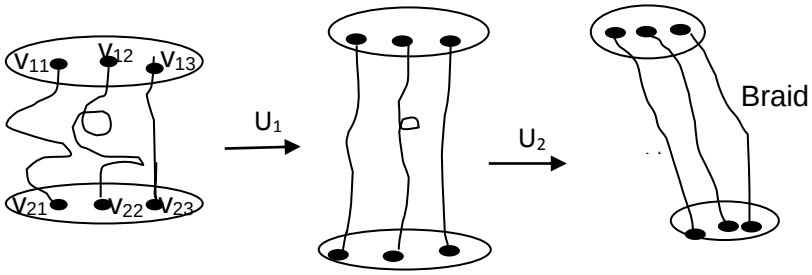


Figure 9

Case2: transposition the inner vertices.

Corolly:

We can obtain braid from tangle graph by using untangle where tangle if we take horizontal line it will intersect the fiber at more than one point ,but braid intersect fiber at exactly one point.

Untangle of tangle hyper graph:

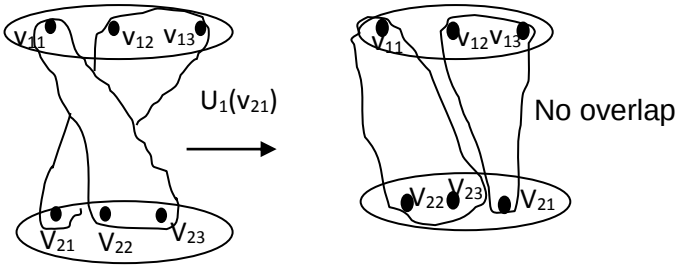


Figure 10

Deformation:

Case 1: Deformation of inner vertices.

Case 2: Deformation of fiber:

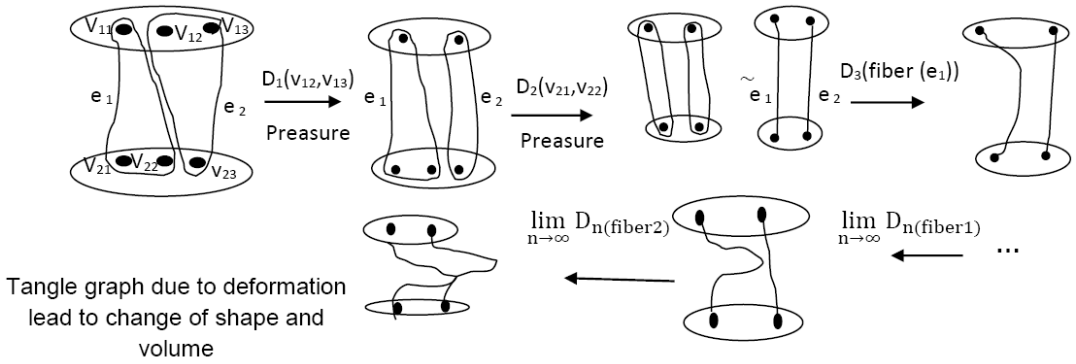


Figure 11

Deformation of hyper tangle graph:

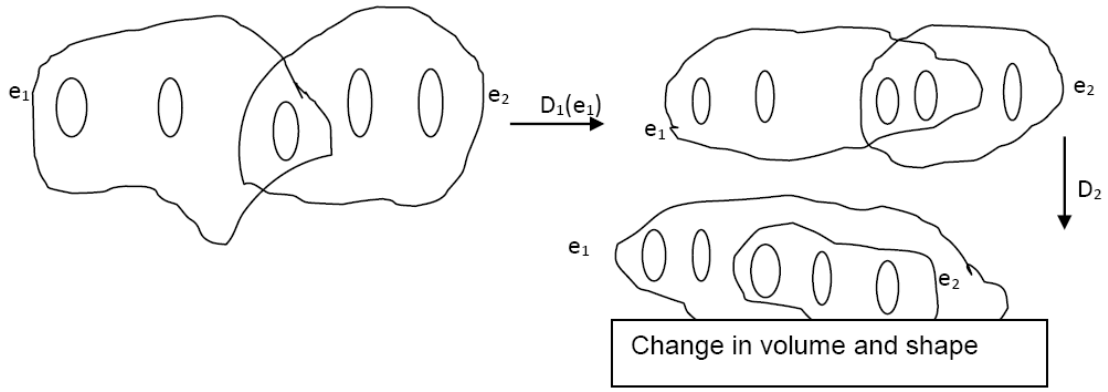


Figure 12

Applications:

1- Sport equpments.

2-In medical field we apply these geometric transformations on DNA to cure the imbalance found in double helix of DNA:

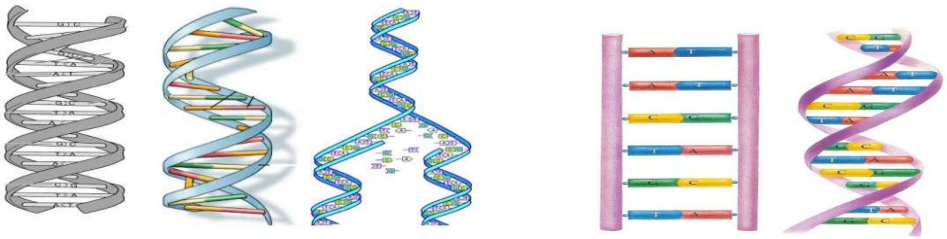


Figure 13

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