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(n-1) – Reconstruction of Tournaments Mn

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Abstract

In this paper, we show that the kind of tournament M_n , which are indecomposable , then this type or tournament are (n-1) RECONSTRUCTION.

Key words:
Reconstruction , Tournament , Indecomposable , Homorphic , Diamond ,Isomorphic.

الخلاصة

في هذا البحث وجدنا ان العلاقة الدورية الدائرية من نوع M_n والتي تتصف بكونها غير قابلة للفصل تكون (1−n) قابلة لأعادة البناء .

الكلمات المفتاحية:

اعادة البناء، العلاقة الدورية الدائرية، العلاقة الغير قابلة للتجزئة، تشاكل، علاقة الماسة.

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INTRODUCTION

Reconstruction questions arise when studying interaction between the isomorphic type of a structure and the isomorphic type of itssubstructures. In this paper we are interested binary relations . We present most of the known results on different kinds of reconstruction : among them we have the fral'see- reconstruction, the Ulam-construction , the max-reconstruction and the set-reconstruction .

For any indecomposable tournament M_n of finite cardinal n we show that this kind of tournaments are (n-1) RECONSTRUCTION , let 1,2,3…. n the vertices of M_n , then M_n – {1} and M_n – { n } are isomorphic to M_{n-1} which is also indecomposable. For x ≠ 1 , n , M_n –{ x } is decomposable and equal to the sum of M_p and M_9 with p < n-1 , q < n-1 . let M_n tournament (n-1) homomorphic to M_n [4].

M_n is indecomposable then M is isomorphic to M_n because the M_n are characterizes by their bounds of cardinal 5: A_1 , A_2 , A_3 A_4 , A_5 and M– admit the same bounds for n ≥ 5 [3].

Definitions:

1 – A tournament M_n consists of finite set v of vertices with a prescribed collection A of ordered pairs of distinct vertices , called the set of arcs of T, which satisfies: for x , y ∈ v , with x ≠ y , (x , y) ∈ A if and only if (y , x) ∈ A . such a tournament M_n is denoted by (V , A) [1].

2 – the tournaments M_n are define on the base E = { 1,2,3,….. n } such that M_n (i , j) = + if and only if I < j-1 or i=j+1. We not that M_4 is a 4- cycle and M_3 is a 3- cycle M_n have the following **Properties** [1].

A) M_n is isomorphic to its converse [1] .

B) M_n is strong i .e that for all x, y there exist a walk from x to y [2].

3 – indecomposable tournament or strong tournament is a tournament that we can not practitioner its base E in interval Ei , such that one of them is of cardinal ≥ 2 [1].

4 – A tournament T is (n-1) - homomorphic to the tournament T (T and T have the same base E), where ∀ x EE then T/E-X ísomorphic to T / E –X [4].

5 – A tournament T is said to be (n-1)- reconstructible where each tournament T (n-1) – hypomophic to T is isomorphic to T [5].

Let the base A= { 0,1,2,3,4 } by dilating a 3-cycle we get A diamond A_5 is a positive diamond if A_5 /{0,1,2,3} IS A NEGATIVE DIAMOND of vertex and A_5 (2,4) = +

We get the diamonds by deleting the 3-cycle by one and only one for the two points from the chain . to two element's 1,2 (positive if the vertex is I and negative if the vertex 2).

(n-1) RECONSTRUCTION of M_n

Theorem :

Let 1,2,3…….n be the vertices of M_n then M_n –{1} and M-{n} are isomorphic to M_{n-1} which is indecomposable. ∀ x ≠ 1 , n M_n – {x} is decomposable and equal to the sum of M_p and M_q with p <n-1 , q<n-1

Proof: let M Be a tournament (n-1) –homomorphic to M_n

– if M Is indecomposable then M IS ISOMORPHIC TO M_n Because the M_n are characterizes by their bounds of cardinal 5, A_1 , A_2 , A_3 , A_4 , A_5 and M– admits the same bounds for n ≥ 5

- if M is decomposable = let A , B two intervals of . THEN M - {1} must be isomorphic to M_{n-1} which is indecomposable, and if 1 belong to A , then A- {1} must be vide, if none , we have again two intervals and M {1} become decomposable (contradiction).

Then A- {1}= φ and A= {1}

By the same method with n

If n belong B (for example) then B= {n} either we have a third interval c, in this case we delete one element x from c, we have by (n-1)- hypomorphie : M - {X} Isomorphic to M_{n-} {x} which is admit only two intervals then M– - {X} Admet Also two intervals i. e A , B then c = {x} and cardinal of M =3 (contradiction) or there is not a third interval and M = A ∪ B (impossible) then M is indecomposable and M– isomorphic To M_n

Note: M_n is a finite tournament (its base is finite, each element of M_n be delate by a set ci to obtain the tournament M_n (the ci are singletons in the case or the dilatation is trivial)

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Characterization the classes R/C_i

Proposition1: let R be a tournament which embedded a 3-cycle, and not embedded to 4-cycle , then R obtained by take the chain by delate some points by 3-cycle.

Proof: let C be a 3-cycle and x ∈ c we can see that R/ C ∪ { X } is a diamond

Let a → b → c → a be a 3-cycle C suppose R(x , a) =+ then R(x , b) = + if none R/ { x , b , c } is a 3-cydes, the we can partition E-C in two sets D+ = {X = X → C } and D- = { X = C → X } Let a ∈ D+ and b ∈ D and u,v ∈ C , the we have R (a , b) = + if none R/ { a , b , u } and R/ { a , b , u } must be 3-cydes and R/ 1{ a ,b, u , v} must then 4-cycle (contradiction)

Corollary:

first we define the form of the indecomposable class R/C_i which neither 4-cycle nor chain and nor 3-cycle we can verify that

1) $|C_i| \neq 3$, because if none then R/C_i must indecomposable which take the form of 3-cycle.

2) $|C_i| \neq 4$ if none R/C_i must be a diamond, decomposable which is not cycle and its vertex.

3) if $|C_i| > 5$, then R/C_i is a M_k either it is decomposable

- case 1: $|C_i| = 5$

-Either R/C_i > 4-cycle , then R/C_i not a chain then there exist in R/C_i a 3-cycle a,b,c by proposition l , R/C_i is decomposable (contradiction)

-or R/C_i embed 4-cycle by theorem, either R/C_i N M_5 (the symbol N means isomorphic) or R/C_i is decomposable (impossible)

Collar ely= if $|C_i| = 5$ then $R/C_i = M_5$

Case 2 = $|C_i| = k > 5$

-either R/C_i embedded 4-cycle will be indecomposable and of cardinal > 4 , then R/C_i is a M_k (by theorem)

-or R/C_i not embed 4-cycle and $|C_i| \geq 3$ by (proposition) the solution for R/C_i will be decomposable (impossible)

Proposition 2 : if R is a solution decomposable i-e (R > A_1, $A_{2,}$ $_A3_,$ A_4, A_5) THEN R take the from dilate a finite chain C.

Proof: R is decomposable , there exist a relation c not singleton and different from R, such that R= D (c) (i.e R is delate from c) suppose that c not a chain i.e there exist a,b,c from c such that c/{a,b,c} is a 3-cycle we delate a,b,c respectively in A,B,C suppose that |A|≥ 3 , and let X ∈ B , y ∈ c let z_1 , z_2 , z_3 ∈ A then R/{ , y } z_1 , z_2 , z_3 x, y } N A_3 or A_1 , and R/{ z_1 , z_2 , z_3 } Is A chain or a 3-cycle , if cardinal of B or C is ≥ 3 then card x < 3 , for x = A,B,C

-if card A= card B= 2 , with x ∈ we have R/A U B U { X } N A_2 , then the only possibility are |A| = 2 , |B|= 1 , |C| = 1 or |A|= |B| = |C| = 1

Conflict of interests.

There are non-conflicts of interest.

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