STATUS SEQUENCE AND DETOUR STATUS SEQUENCE OF A COCONUT TREE

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Abstract: Let G=(V,E) be a simple undirected connected graph. The status of a vertex $v \in V$ of a graph G is the sum of shortest distance from v to the other vertices of G. The status sequence of G is the list of its status value in non-decreasing order. The detour status of a vertex $v \in V$ of a graph G is the sum of longest distance from v to the other vertices of G. The detour status sequence of G is the list of its detour status values in non-decreasing order. In this paper a status sequence (SS) and detour status sequence (DSS) of a coconut tree is investigated.

Keywords: status sequence, detour status sequence, status values, detour status values.

Introduction: Let G=(V,E) be a simple undirected connected graph. For vertices u and v in a connected graph G, the distance d(u,v) is the length of a shortest u-v path in G. A u-v path of length d(u,v) is called u-v geodesic. The status of a vertex of a graph G is the sum of the shortest distances from v to the other vertices of G. The status sequence(SS) of G is the list of its status value in non-decreasing order. The length of a longest u-v path between two vertices u and v in G is called a detour distance D(u,v) between u and v. A u-v path of length D(u,v) is a u-v detour. The detour status of a vertex v□V of a graph G is the sum of longest distance from v to the other vertices of G. The detour status sequence(DSS) of G is the list of its detour status values in non-decreasing order. In this paper, a status sequence (SS) and detour status sequence (DSS) of a coconut tree is investigated with some examples.

Theorem:1.1: The status sequence of the coconut tree is
$SS(CT(n,n))=\{SS(u_0)=n(n-\lfloor n/2\rfloor)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=n(n-\lfloor n/2\rfloor)+2n-2$ for j=1 to 2n }
and Detour status sequence of the coconut tree is
$DSS(CT(n,n))=\{SS(u_0)=n(n-\lfloor n/2\rfloor)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=n(n-\lfloor n/2\rfloor)+2n-2$ for j=1 to 2n },
when n is odd and $n\geq 3$
The status sequence of the coconut tree is
$SS(CT(n,n))=\{SS(u_0)=(n/2)(n+1)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=(n(n+1)/2)+2n-2$ for j=1 to 2n }
and Detour status sequence of the coconut tree is
$DSS(CT(n,n))=\{SS(u_0)=(n(n+1)/2)$,
$SS(u_i)=u_0+2i$, for =1 i to n-1 ,
$SS(v_j)=(n(n+1)/2)+2n-2$ for j=1 to 2n },
when n is even and $n\geq 2$

Proof:
Let $V(CT(n,n))=\{u_i$ / i =0 to n-1,j=1 to n } be the vertex set of CT(n,n)
$E(CT(n,n))=\{u_0v_j, u_iu_{i+1}$ / i=1 to n-1, j=1 to n},be the edge set CT(n,n)
Case(i) n is odd: If n=3, the SS & DSS of CT(n,n) is
SS(CT(3,3))={6,8,10,10,10,12} and
DSS(CT(3,3))= {6,8,10,10,10,12}
The result is true for n=3By mathematical induction,Let us assume that the result is true for k= n & $n\geq 3$ and n is odd.
Clearly, this result is true for k=n+1Therefore the SS & DSS of CT(n,n) is given by
$SS(CT(n,n))=\{SS(u_0)=n(n-\lfloor n/2\rfloor)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=n(n-\lfloor n/2\rfloor)+2n-2$ for j=1 to 2n}
and $DSS(CT(n,n))=\{SS(u_0)=n-(n-\lfloor n/2\rfloor)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=n(n-\lfloor n/2\rfloor)+2n-2$ for j=1 to 2n }
Case(i) n is even
If n=2, the SS & DSS of CT(n,n) is
SS(CT(2,2))={3,5,5,5}and
DSS(CT(2,2))= {3,5,5,5}The result is true for n=2
By mathematical induction,Let us assume that the result is true for k= n & $n\geq 2$ and n is even.
Clearly, this result is true for k=n+2Therefore the SS & DSS of CT(n,n) is given by
$SS(CT(n,n))=\{SS(u_0)=(n/2)(n+1)$,
$SS(u_i)=u_0+2i$, for i=1 to n-1 ,
$SS(v_j)=(n/2)(n+1)+2n-2$ for j=1 to 2n } and
$DSS(CT(n,n))=\{SS(u_0)=(n/2)(n+1)$,
$SS(u_i)=u_0+2i$, for =1 i to n-1 ,
$SS(v_j)=(n/2)(n+1)+2n-2$ for j=1 to 2n },
when n is even and $n\geq 2$.

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