



Supplement of

A novel compound topological invariant for isomorphism detection of planar kinematic chains

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```

tic
TT={};
X1=[];
X2=[];
AA=P12;
for f=1:length(AA)
A1=AA{f};
B1=A1^4;
[row, col] = size(B1);
for i = 1 : row
    a = B1(i, :);
    b = sort(a, 'descend');
    B1(i, :) = b;
end
Y1 = B1;
Y11=Y1;
A11=A1;
D1=A1;
T1=Y1;
Z1=Y11;
Z5=Z1;
T5=T1;
xh=1;
k=0;
T4=[];
while(xh==1)
    k=k+1;
for i=1:size(Z1,2)
    Z2=Z1(:,i);
    flag=1;
    j=0;
    t=1;
    while(flag==1)
        j=j+1;
        if Z2(t)>Z2(j)
            Z1(j,:)=[0];
            T1(j,:)=[0];
            D1(j,:)=[0];
        elseif Z2(t)<Z2(j)
            Z1(t,:)=[0];
            T1(t,:)=[0];
            D1(t,:)=[0];
            t=j;
            j=0;
        end
    end
    xh=xh+1;
end

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        end
        if j==size(Z2,1)
            flag=0;
        end
    end
end
n=size(Z1,1);
Z3=[];
T3=[];
D3=[];
for i=1:n
    if Z1(i,1)>0
        Z3=[Z3;Z1(i,:)];
        T3=[T3;T1(i,:)];
        D3=[D3;D1(i,:)];
    end
end
X1{k}=T3;
X2{k}=D3;
Z4=[];
for i=1:size(Z3,1)
    Z4=[Z4;Z3(i,:)];
    T4=[T4;T3(i,:)];
end
n=size(Z5,1);
Z1=[];
T1=[];
for i=1:n
    if Z5(i,:)==Z3(1,:)
        Z1=Z1;
        T1=T1;
    else
        Z1=[Z1;Z5(i,:)];
        T1=[T1;T5(i,:)];
    end
end
Z5=Z1;
T5=T1;
Z=Z4;
T11=T4;
if isempty(T5)==1
    xh=0;
end
end
end

```

```

TT{f}=T4;
end
jc1=1;
jc2=2;
if length(TT)<2
    tgxh=0;
else
    tgxh=1;
end
k={};
while(tgxh==1)
T111=TT{jc1};
T222=TT{jc2};
if size(T111,1)==size(T222,1)
if T111==T222
    k=[AA(jc1);AA(jc2)];
    AA(jc2)=[];
    TT(jc2)=[];
else
    jc2=jc2+1;
end
else
    jc2=jc2+1;
end
if jc2==length(AA)+1
    jc1=jc1+1;
    jc2=jc1+1;
end
if jc1>=length(AA)
    tgxh=0;
end
end
toc

```