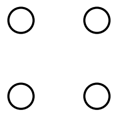
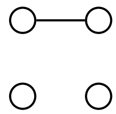
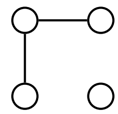
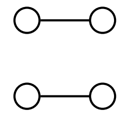
定义. 连通且无圈的无向图称为无向树，简称**树**。

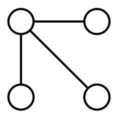
在下列具有4个顶点的互相不同构的所有无向图中，有几个为树?

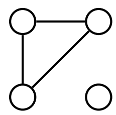

A

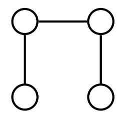

B

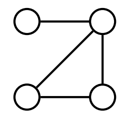

C

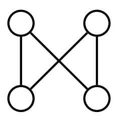

D

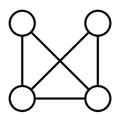

E

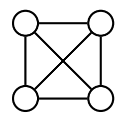

F


G


H

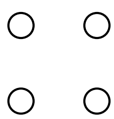

I

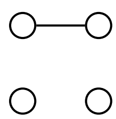

J

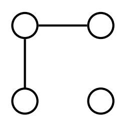

K

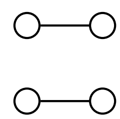
定义. 一个没有圈的无向图称为无向森林，简称**森林**。

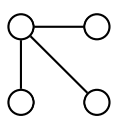
在下列具有4个顶点的互相不同构的所有无向图中，有几个为森林?

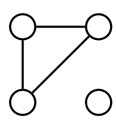

A

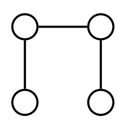

B

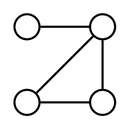

C

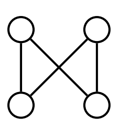

D

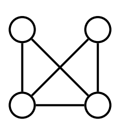

E

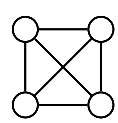

F


G


H


I


J


K

定义. 设$G=(V,E)$为一个图，G的一个生成子图$T=(V,F)$如果是树，则称T为G的**生成树**。

在下列具有4个顶点的互相不同构的所有无向图中，有几个无向图有一棵生成树与图E同构?

A B C D

E F G H

I J K

定义. 设$G=(V,E)$为一个图，G的一个生成子图$T=(V,F)$如果是树，则称T为G的**生成树**。

在下列具有4个顶点的互相不同构的所有无向图中，有几个无向图有一棵生成树与图G同构?

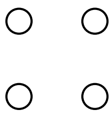
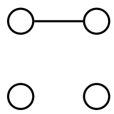
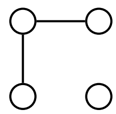
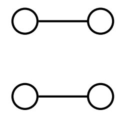
A B C D

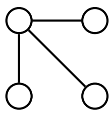
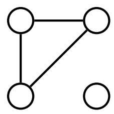
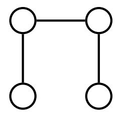
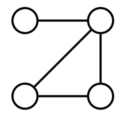
E F G H

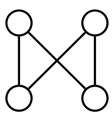
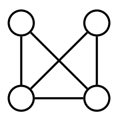
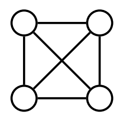
I J K

定义. 设v为图G的一个顶点，如果$G-v$的支数大于G的支数，则称顶点v为图G的一个**割点**。

在下列具有4个顶点的互相不同构的所有无向图中，有几个图有且仅有两个割点?

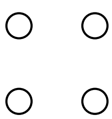
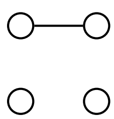
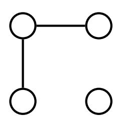
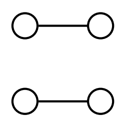

A

B

C

D

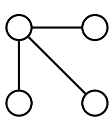
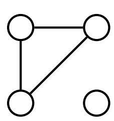
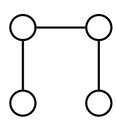
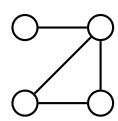

E

F

G

H

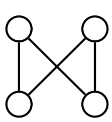
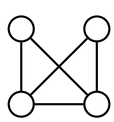
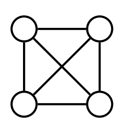

I

J

K

定义. 图G的一条边x称为G的一座**桥**，如果$G-x$的支数大于G的支数。

在下列具有4个顶点的互相不同构的所有无向图中，有几个无向图有且仅有两条割边?

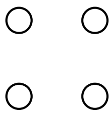

A

B

C

D

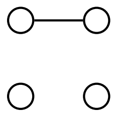

E

F

G

H

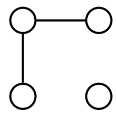

I

J

K

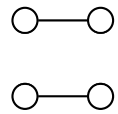
定义. 设$G=(V,E)$为图，$S\subseteq E$。如果从G中去掉S中的所有边得到的图$G-S$的支数大于G的支数，而去掉S的任一真子集中的边得到的图的支数不大于G的支数，则称S为G的一个**割集**。

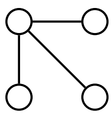
在下列具有4个顶点的互相不同构的所有无向图中，图H有几个互不相同的割集？

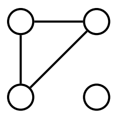

A

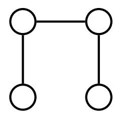

B

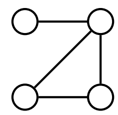

C

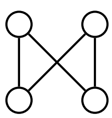

D

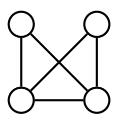

E

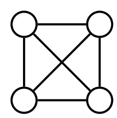

F


G


H

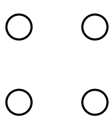

I

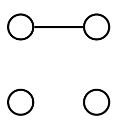

J

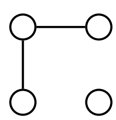

K

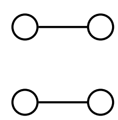
定义. 图G的**顶点连通度**是指为了产生一个不连通图或平凡图所需要从G中去掉的最少顶点数目，记为$\kappa(G)$。

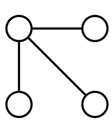
在下列具有4个顶点的互相不同构的所有无向图中，有几个顶点连通度为2？

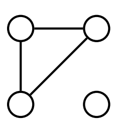

A

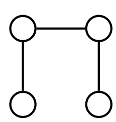

B

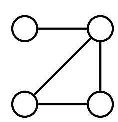

C

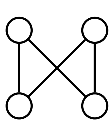

D

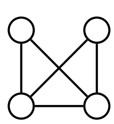

E

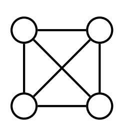

F


G


H

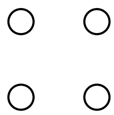
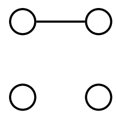
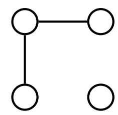
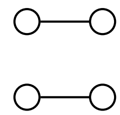

I


J

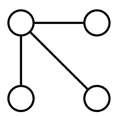
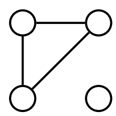
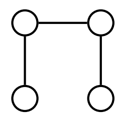
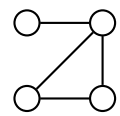

K

定义. 图G的**边连通度**是指为了产生一个不连通图或平凡图所需要从G中去掉的最少边的数目，记为$\lambda(G)$。

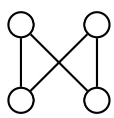
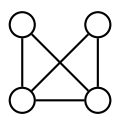
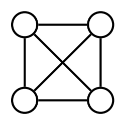
在下列具有4个顶点的互相不同构的所有无向图中，有几个边连通度为2?

A B C D

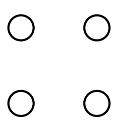
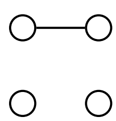
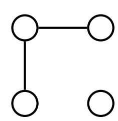
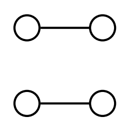
E F G H

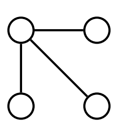
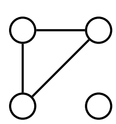
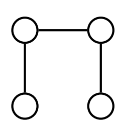
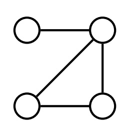
I J K

定义. 设G为一个图，如果$\kappa(G) \geq n$，则称G为n-**顶点连通**的，简称n-连通。

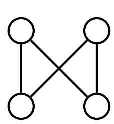
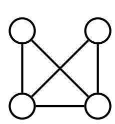
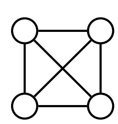
在下列具有4个顶点的互相不同构的所有无向图中，有几个为1−连通的无向图?

A B C D

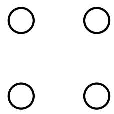
E F G H

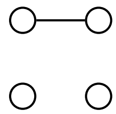
  

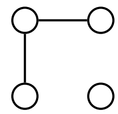
I J K

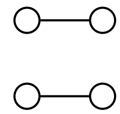
定义. 设G为一个图，如果$\lambda(G) \geq n$，则称G为n-**边连通**的。

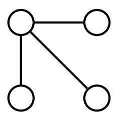
在下列具有4个顶点的互相不同构的所有无向图中，有几个为1边连通的无向图?

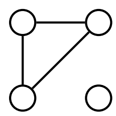

A

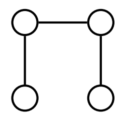

B

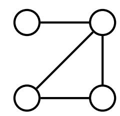

C

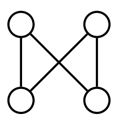

D

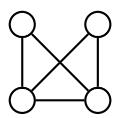

E

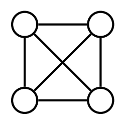

F


G

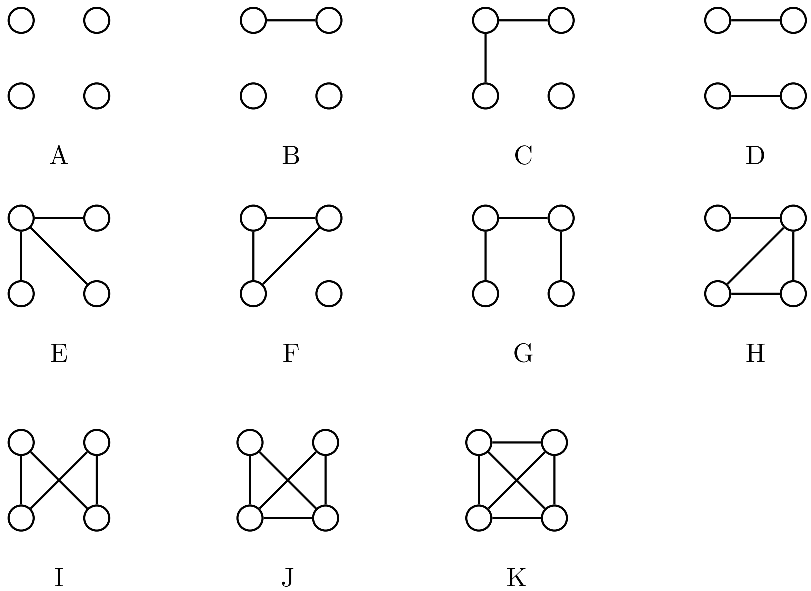

H


I

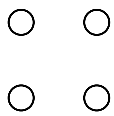

J

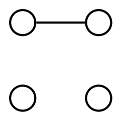

K

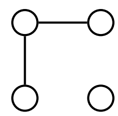
在下列具有4个顶点的互相不同构的所有无向图中，有几个具有完全匹配的偶图？

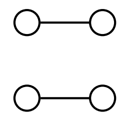


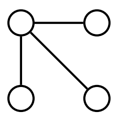
在下列具有4个顶点的互相不同构的所有无向图中，有几个具有完美匹配的无向图?

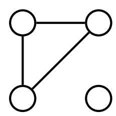

A

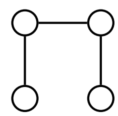

B

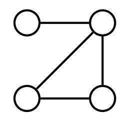

C

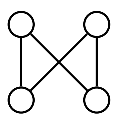

D

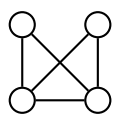

E

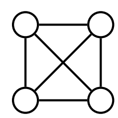

F


G


H

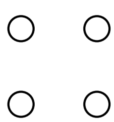

I

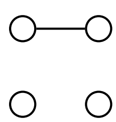

J

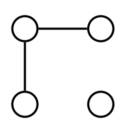

K

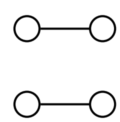
定义. 图G称为被嵌入平面S内，如果G的图解已画在S上，而且任意两条边均不相交（除可能在端点相交外）。 已嵌入平面内的图称为**平面图**。如果一个图可以嵌入平面，则称此图为**可平面的**。

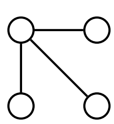
在下列具有4个顶点的互相不同构的所有无向图中，有几个可平面的无向图?

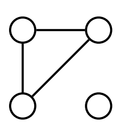

A

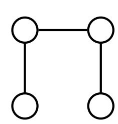

B

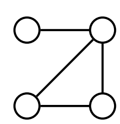

C

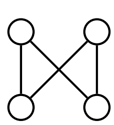

D

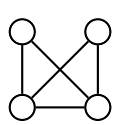

E

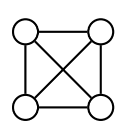

F


G


H


I

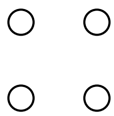

J


K

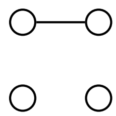
定义. 图的一种**着色**是指对图的每个顶点指定一种颜色，使得没有两个临接的顶点有同一种颜色。图G的一个$n-$**着色**是用n种颜色对G的着色。

定义. 图G的**色数**是使G为$n-$着色的数n的最小值，图G的色数记为$\chi(G)$。若$\chi(G) \leq n$，则称G为$n-$**可着色**的。若$\chi(G) = n$，则称G为n**色**的。

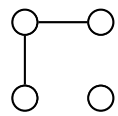
在下列具有4个顶点的互相不同构的所有无向图中，有几个图的色数为3?



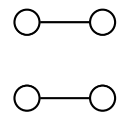
A



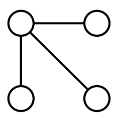
B



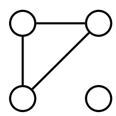
C



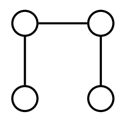
D



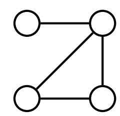
E



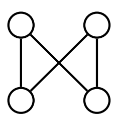
F



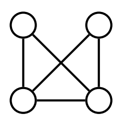
G



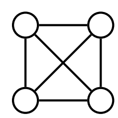
H



I



J



K