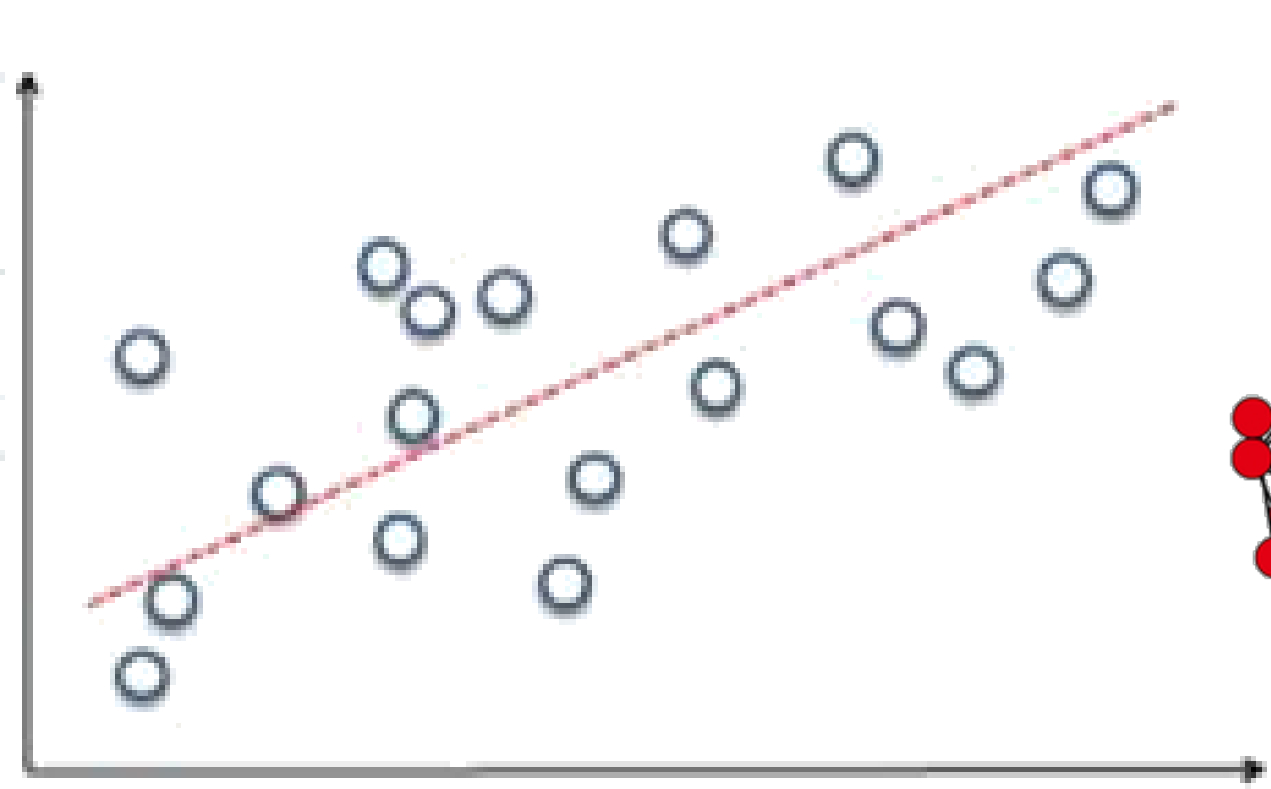
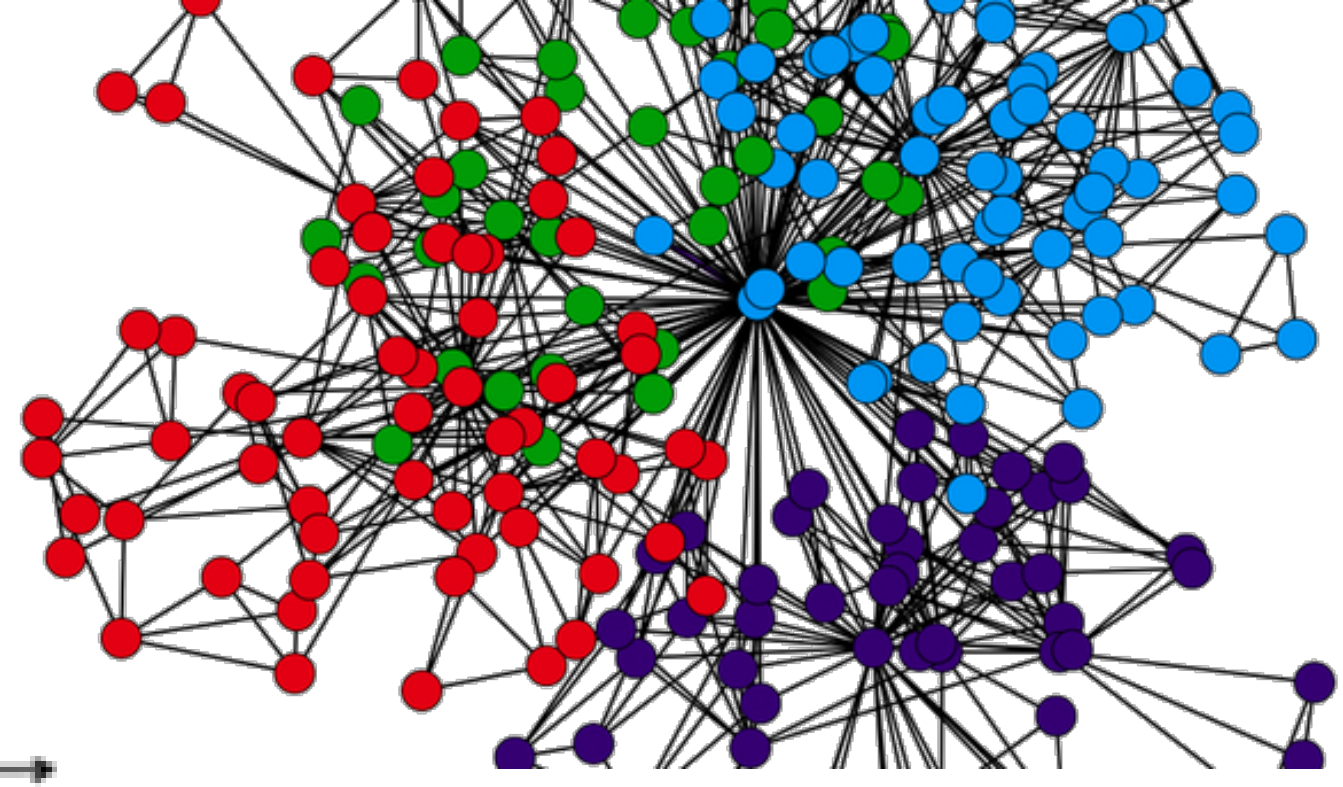
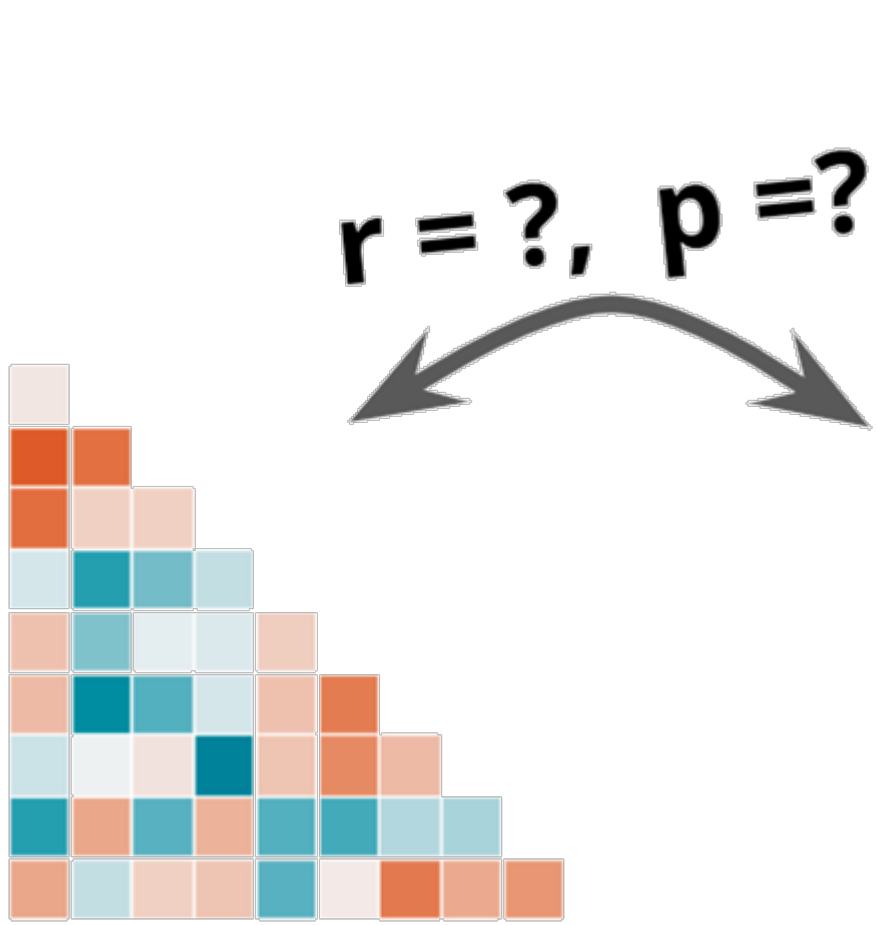
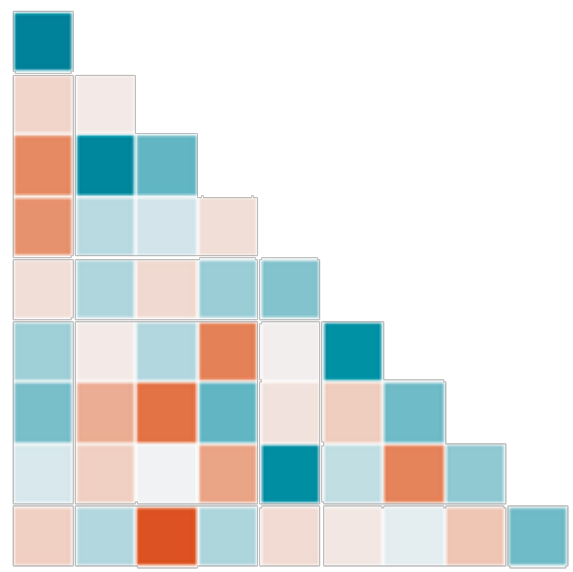




CORRELATION



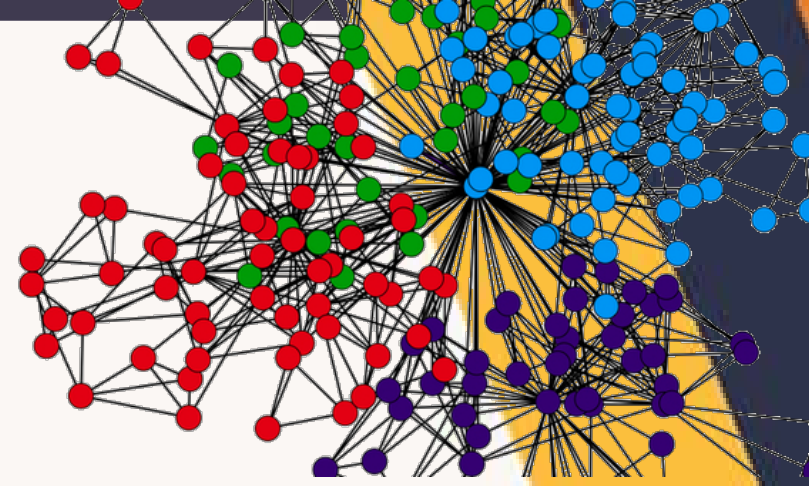


सहसंबंध

- Introduction
- Degree
- Measure & Types

CORRELATION ⇔

सहसंबंध



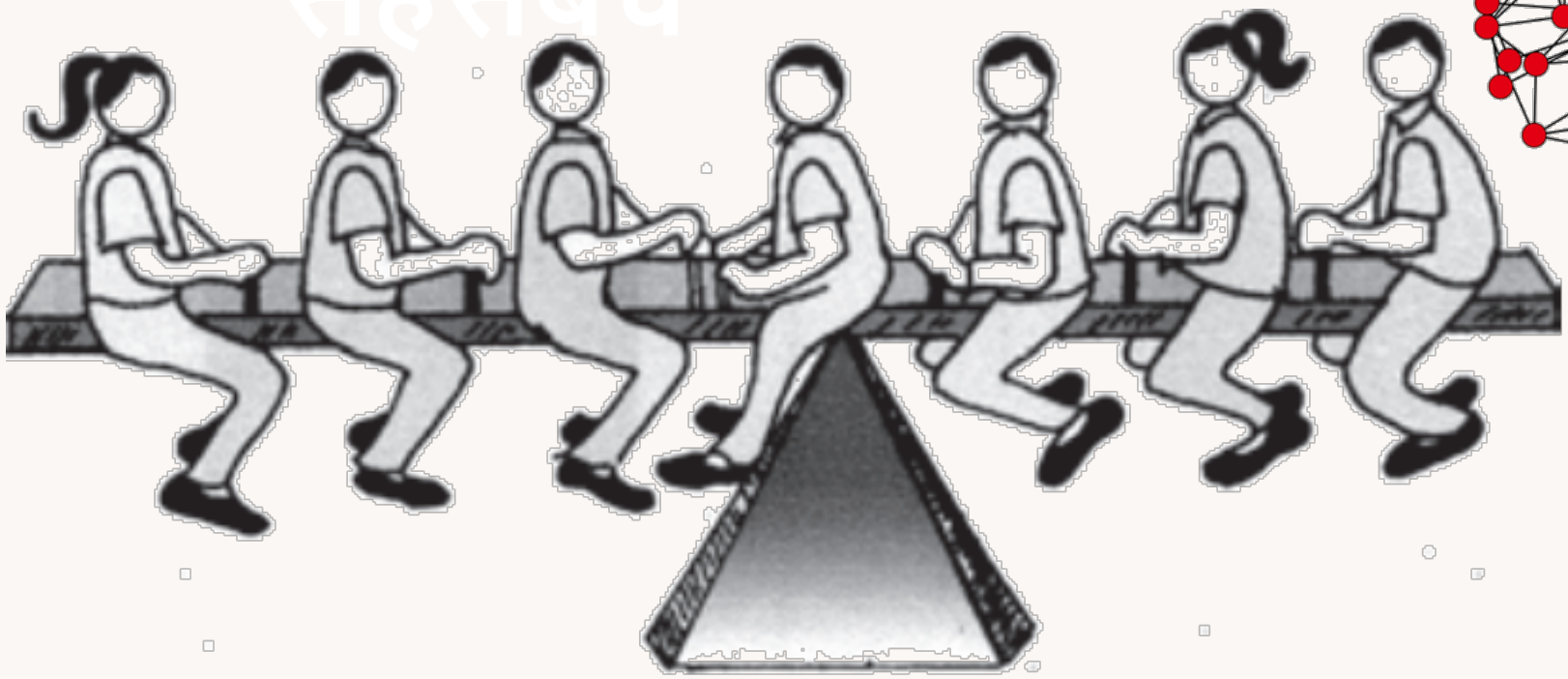
INTRODUCTION ⇔ izLrkouk

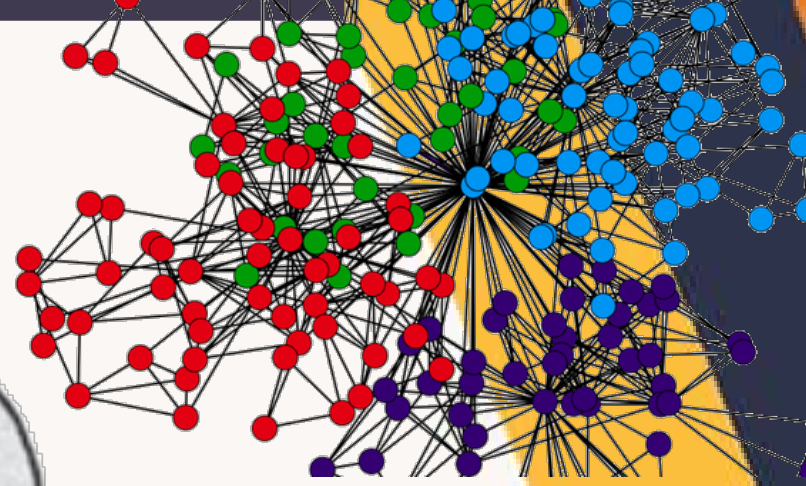
you will learn how to examine the relationship between two variables.

vki ;g lh[ksaxs fd nks pjksa osQ chp osQ laca/ dk ijh{k.k dSls djsaA

CORRELATION ⇔

सहसंबंध

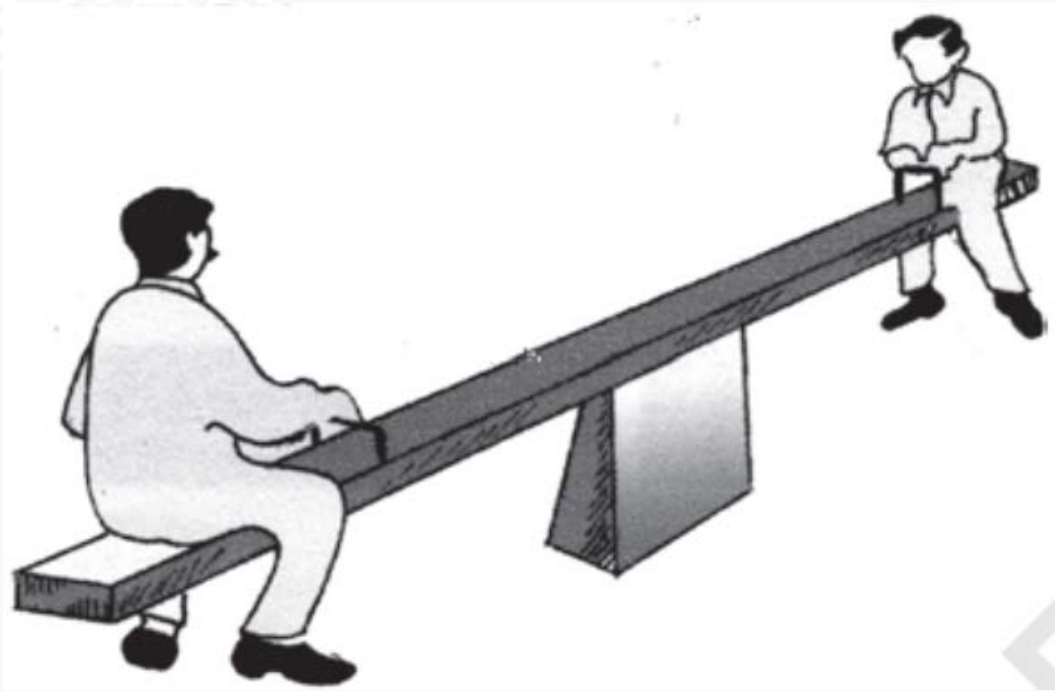


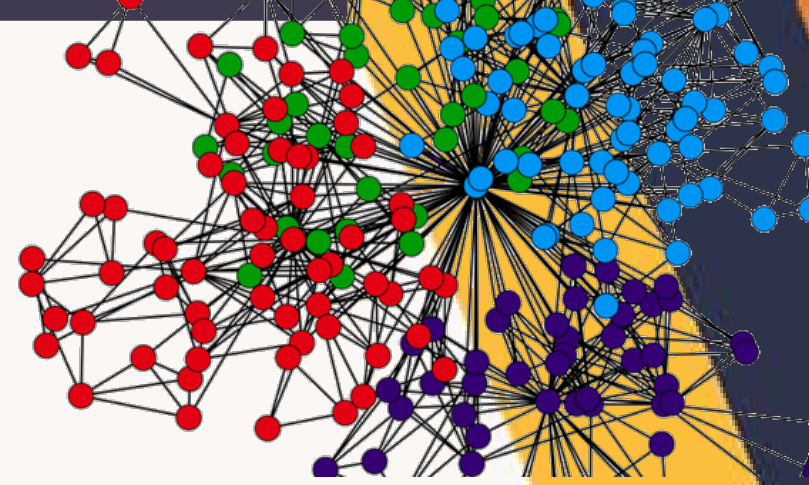


It the value of one variable changes, does the value of the other also change?

;fn ,d pj dk eku cnyrk gS rks D;k nwljs dk eku Hkh cny tkrk gS

CORRELATION ⇔



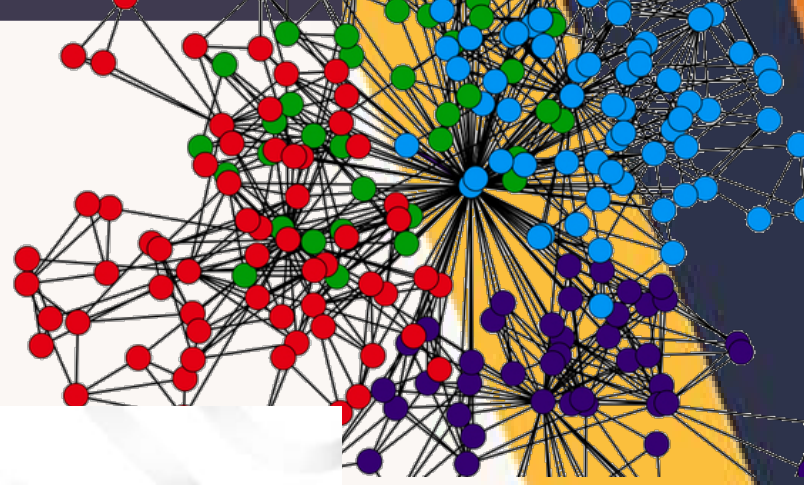


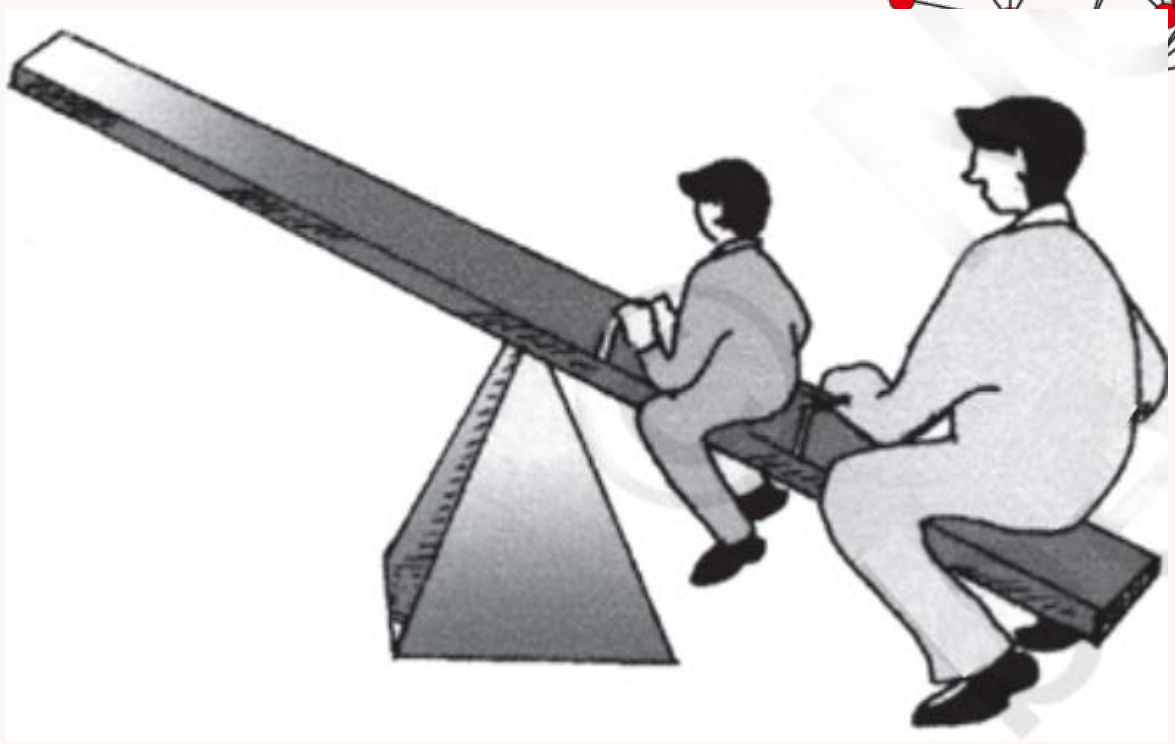
Do both the variables move in the same direction?

D;k nksuksa pjksa esa leku fn'kk esa ifjorZu gksrk gS

CORRELATION ⇔

सहसंबंध





How strong is the relationship?

mudk ;g laca/ fdruk ?kfu"B (iDdk) gS

CORRELATION ⇔

सहसंबंध

What Does Correlation Measure?

lglaca/ fdldk ekiu djrk gS\

Correlation studies and measures the direction and intensity of relationship among variables.

lglaca/ pjksa osQ chp laca/ksa dh xgurk ,oa fn'kk dk vè;;u ,oa ekiu djrk gSA

CORRELATION ⇔

सहसंबंध

Types of Correlation

lglaca/ osQ izdkj

Correlation is commonly classified into negative and positive correlation. The correlation is said to be positive when the variables move together in the same direction.

lglaca/ dks vkerkSj ij /ukRed ;k ½.kkRed lglaca/ osQ :i esa oxhZÑr fd;k tk ldrk gSA tc pjksa dh xfr ,d gh fn'kk esa ,d lkFk gksrh gS rks lglaca/ dks /ukRed dgk tkrk gSA

CORRELATION ⇔

सहसंबंध

The correlation is negative when they move in opposite directions. When the price of apples falls its demand increases. When the prices rise its demand decreases.

tc pj foijhr fn'kk esa xfreku gksa rks lglaca/ ½.kkRed dgykrk gSA tc lscksa dh dher esa fxjkoV vkrh gSa rks mudh ek¡x c<+rh gS rks ek¡x de gks tkrh gSaA

CORRELATION ⇔

सहसंबंध

Properties of Correlation Coefficient

r has no unit. It is a pure number. It means units of measurement are not part of r. r between height in feet and weight in kilograms, for instance, could be say 0.7.

lglaca/ xq.kkad osQ xq.k

r dh dksbZ bdkbZ ugha gksrhA ;g ,d la[;k&ek=k gSA bldk rkRi;Z gS fd eki dh bdkb;k¡ r dk fgLlk ugha gSaA mnkgj.k osQ fy,] dn (iqQVksa esa) rFkk otu (fd-xzk- esa) osQ chp r gS 0-7A

CORRELATION ⇔

सहसंबंध

- A negative value of r indicates an inverse relation.
- If r is positive the two variables move in the same direction.
- The value of the correlation coefficient lies between -1 and +1, –1 ≤ r ≤1.
- r dk ½.kkRed eku izfrykse laca/ n'kkZrk gSA
- ;fn r /ukRed gksrk gS rks nksuksa pj ,d gh fn'kk esa xfreku gksrs gSaA
- lglaca/ xq.kkad dk eku &1 rFkk $1 osQ chp fLFkr gksrk gS –1 < r < +1A

CORRELATION ⇔

सहसंबंध

- If r = 0 the two variables are uncorrelated. There is no linear relation between them.
- If r = 1 or r = –1 the correlation is perfect and there is exact linear relation.

- r = 0, rks bldk vFkZ gS fd nks pjksa esa lg laca/ ugha gSA muds chp dksbZ js[kh; laca/ ugha gSA
- r = 1 vFkok r = -1] rks bldk vFkZ gS fd lglaca/ iw.kZ gS vkSj pjksa ds chp lVhd js[kh; laca/ gSA

CORRELATION ⇔

सहसंबंध

- **A high value of r indicates strong linear relationship. Its value is said to be high when it is close to +1 or –1.**
- **A low value of r (close to zero) indicates a weak linear relation.**

- **r osQ eku dk gksuk] ?kfu"B js[kh; laca/ dks bafxr djrk gSA blosQ eku dks mPp rc dgk tkrk gS tc ;g $1 vFkok &1 osQ fudV gksrk gSA**
- **r dk fuEu eku ('kwU; osQ fudV)] ean js[kh; laca/ dks bafxr djrk gS]**

CORRELATION ⇔

सहसंबंध

DEGREE OF CORRELATION

+1 Prefect positive Correlation

0 Correlation

-1 Prefect Negative Correlation

CORRELATION ⇔

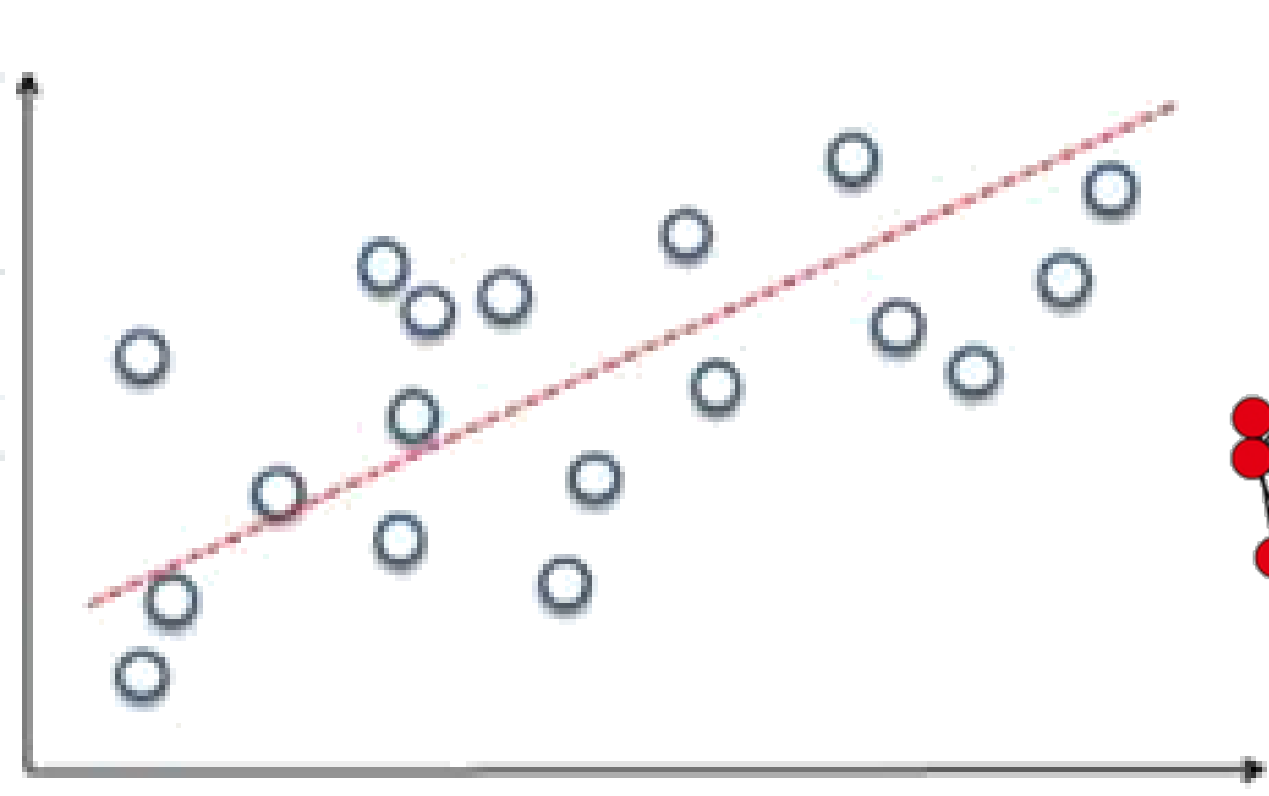
सहसंबंध

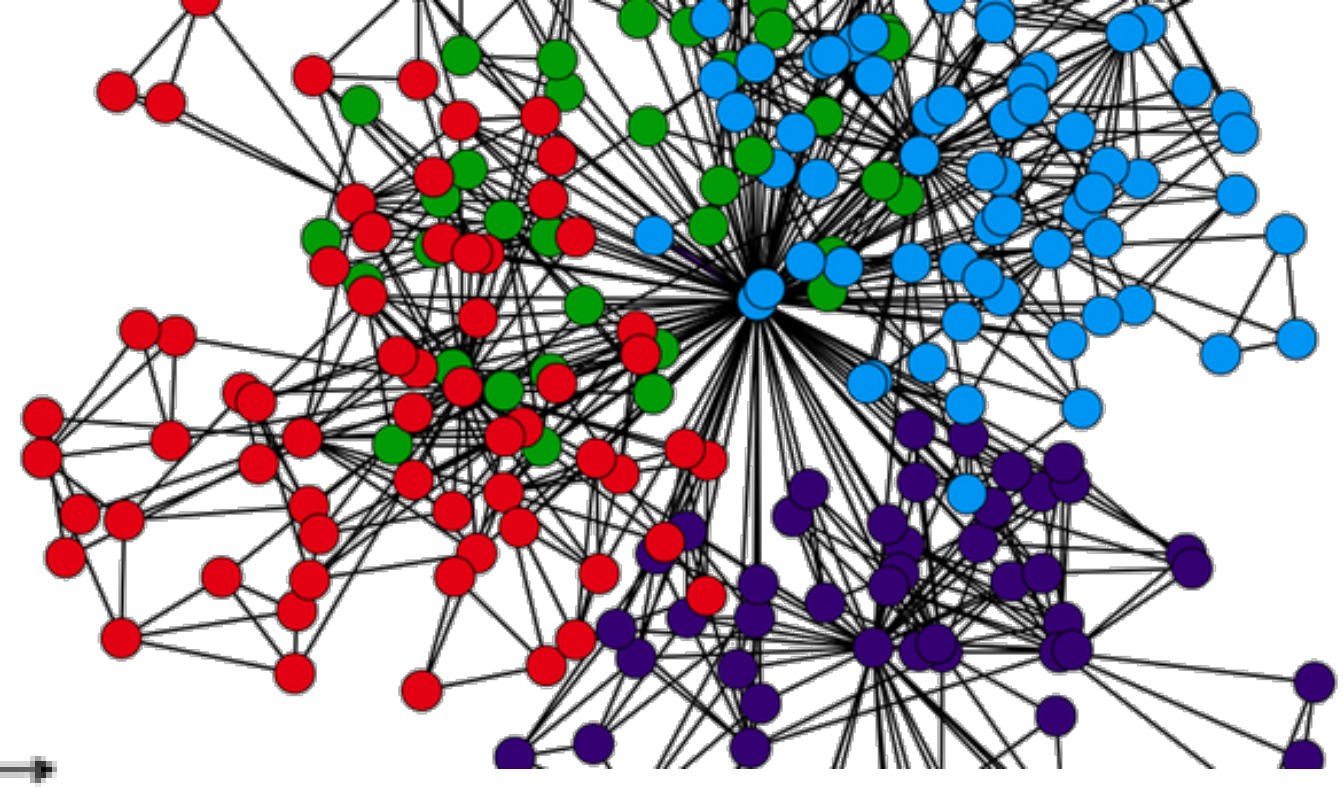
TECHNIQUES FOR MEASURING CORRELATION

lglaca/ dks ekius dh izfof/;k¡

Three important tools used to study correlation are scatter diagrams, Karl Pearson's coefficient of correlation and Spearman's rank correlation.

lglaca/ oQks ekius osQ fy, ;s egRoiw.kZ lkaf[;dh; midj.k gSa% izdh.kZ vkjs[k] dkyZ fi;jlu dk lglaca/ xq.kkad rFkk Lih;jeSu dk dksfV lglaca/A





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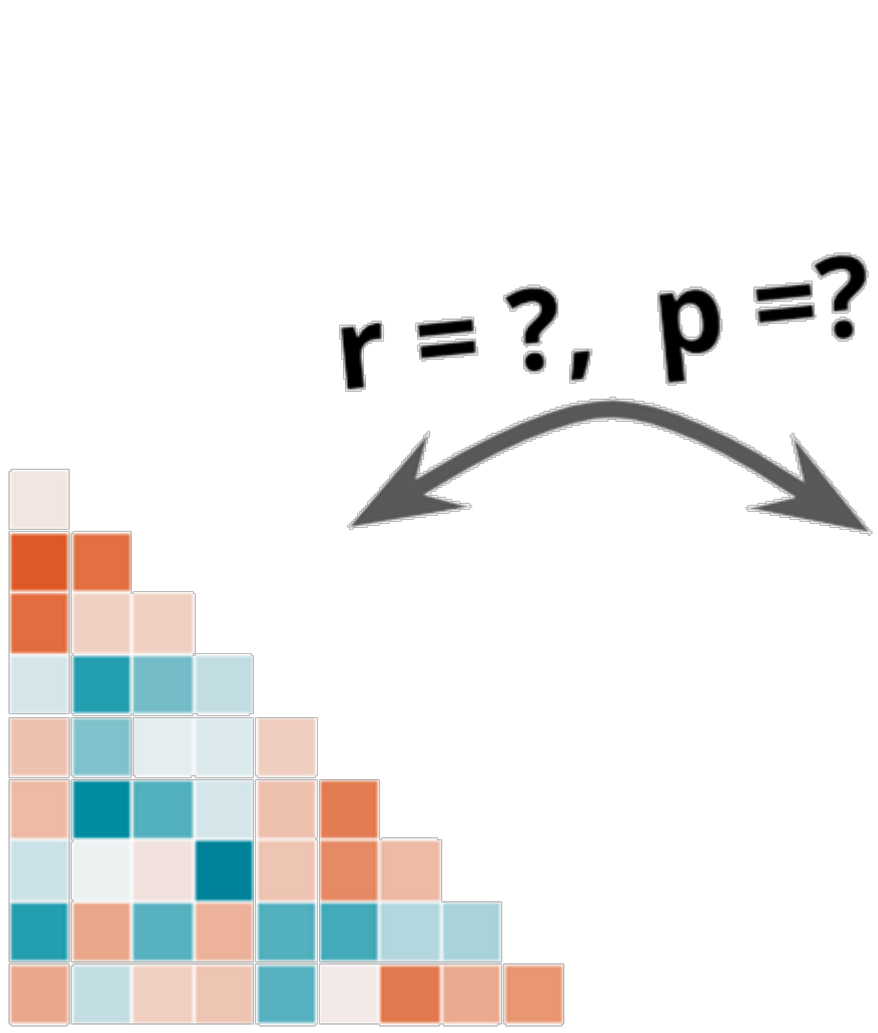
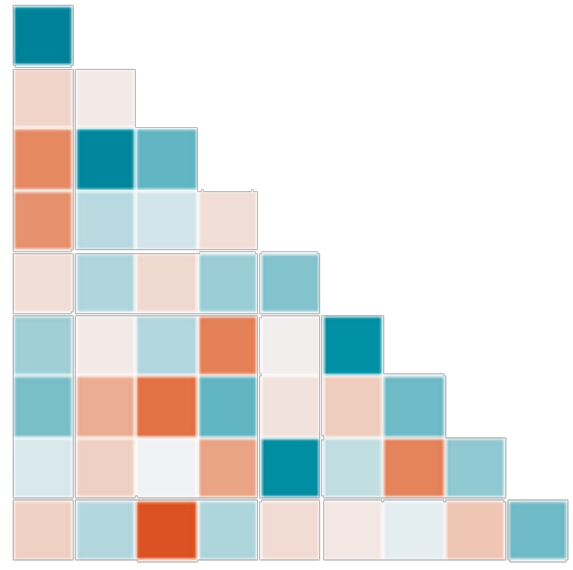
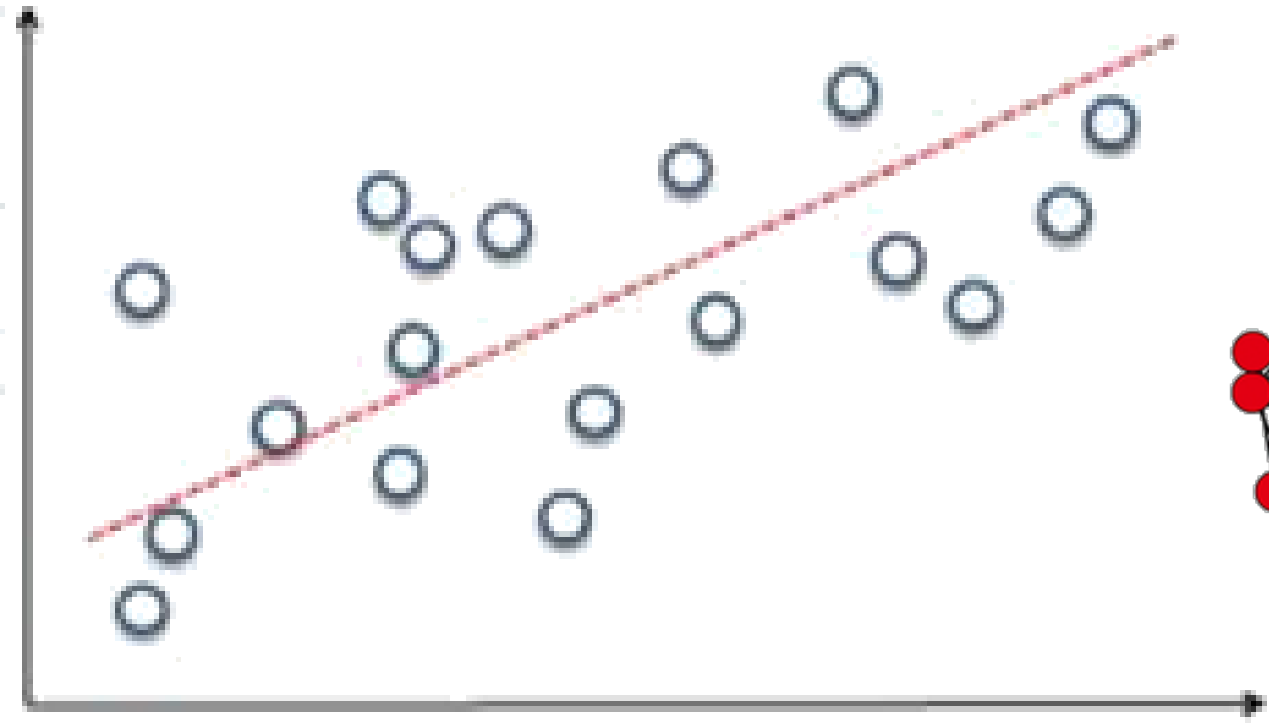
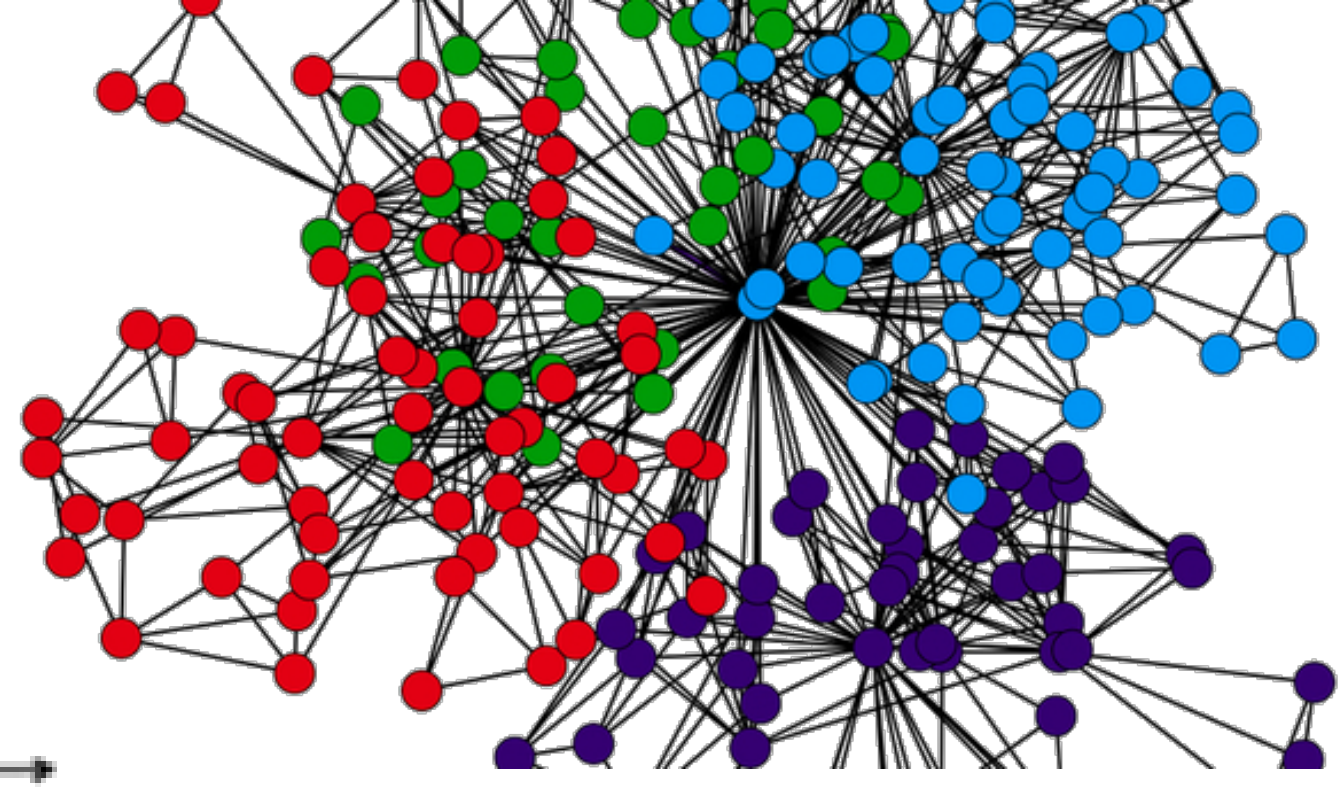
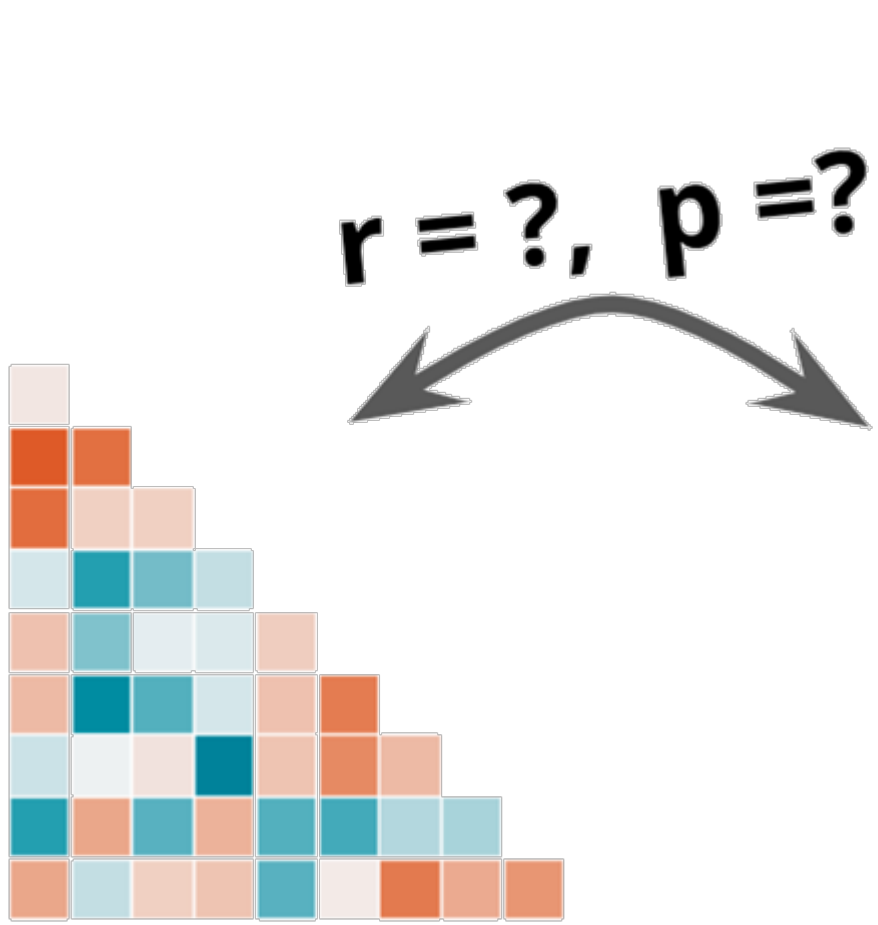






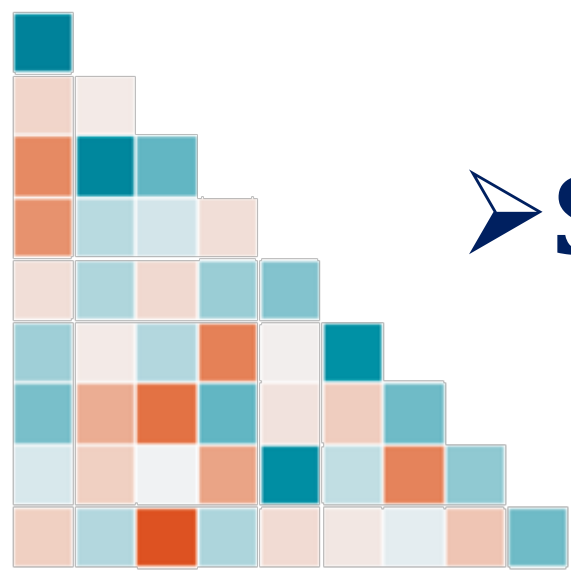


CORRELATION



सहसंबंध

- **Scatter diagram**



CORRELATION ⇔

सहसंबंध

SCATTER DIAGRAM

A scatter diagram visually presents the nature of association without giving any specific numerical value. A numerical measure of linear relationship between two variables is given by Karl Pearson's coefficient of correlation. A relationship is said to be linear if it can be represented by a straight line.

izdh.kZ vkjs[k lkgp;Z osQ Lo:i dks dksbZ fof'k"V la[;kRed eku fn, fcuk n`'; :i esa izLrqr djrk gSA dkyZ fi;jlu dk lglaca/&xq.kkad nks pjksa osQ chp osQ js[kh; laca/ksa dk la[;kRed ekiu djrk gSA laca/ dks rc js[kh; dgk tkrk gS] tc bls ,d lh/h js[kk }kjk izLrqr fd;k tk losQA

CORRELATION ⇔

Positive Correlation

CORRELATION ⇔

सहसंबंध

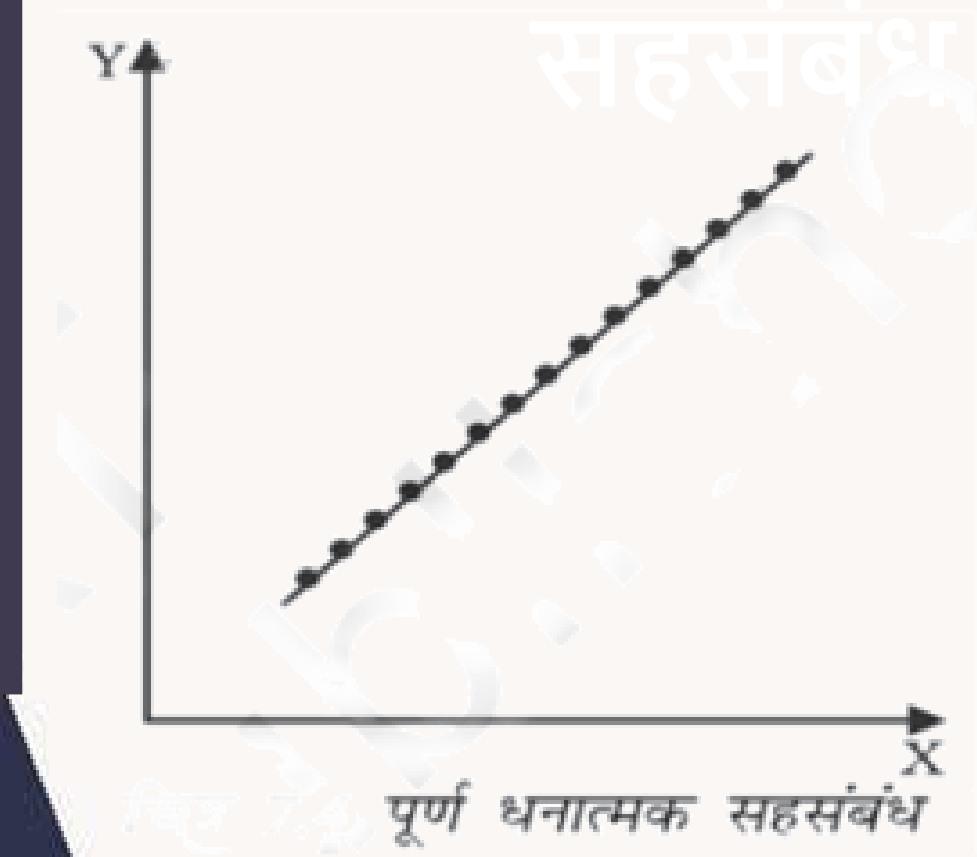
Negative Correlation

CORRELATION ⇔

सहसंबंध

No Correlation

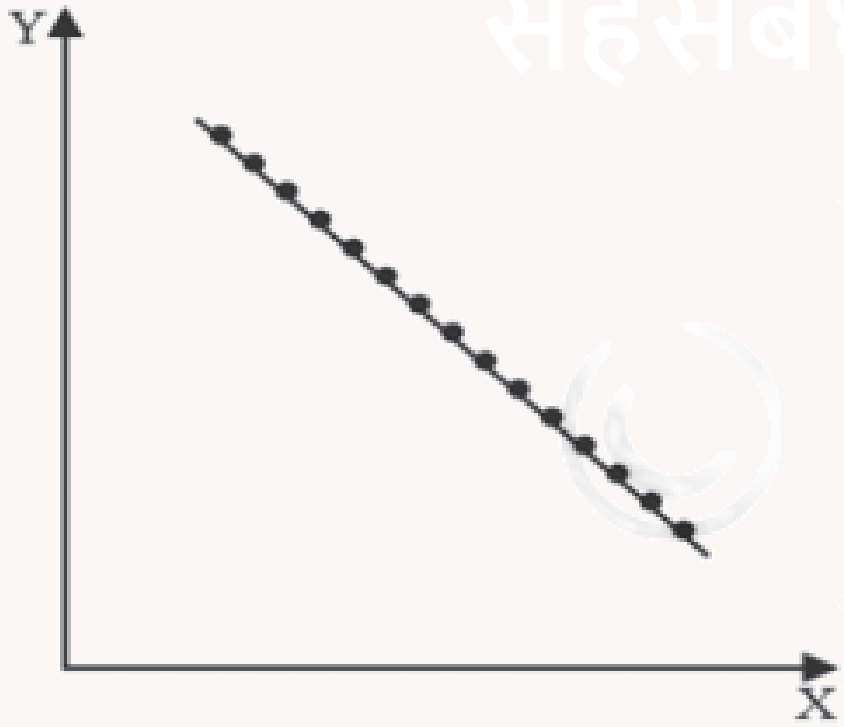
CORRELATION ⇔



Prefect Positive Correlation

CORRELATION ⇔

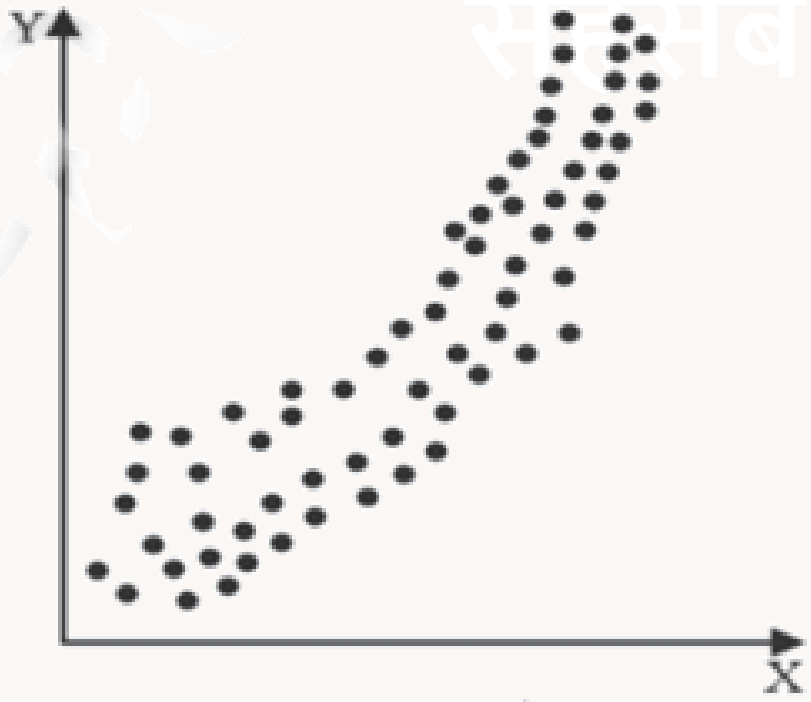
सहसंबंध



चित्र 7.5 पूर्ण ऋणात्मक सहसंबंध

Perfect Negative Correlation

CORRELATION ⇔



चित्र 7.6 धनात्मक गैर-रेखीय संबंध

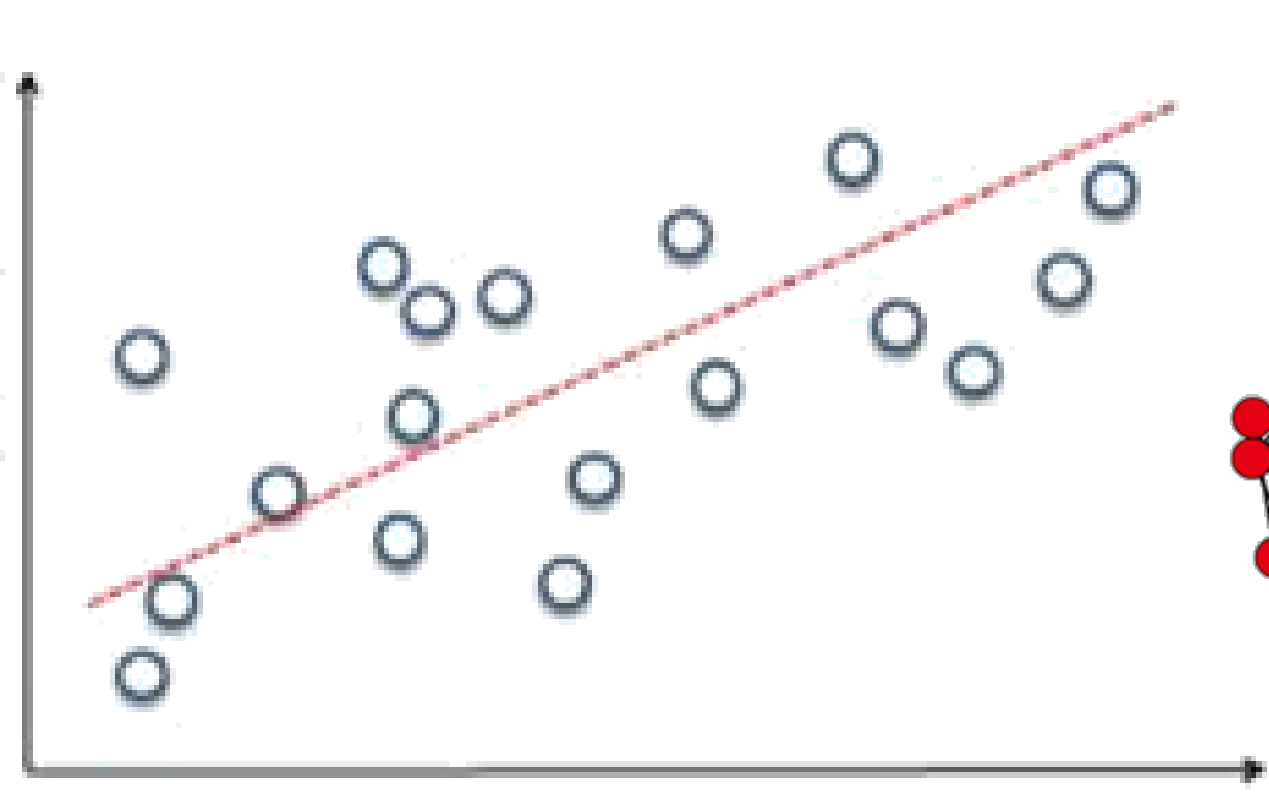
Positive non – liner relation

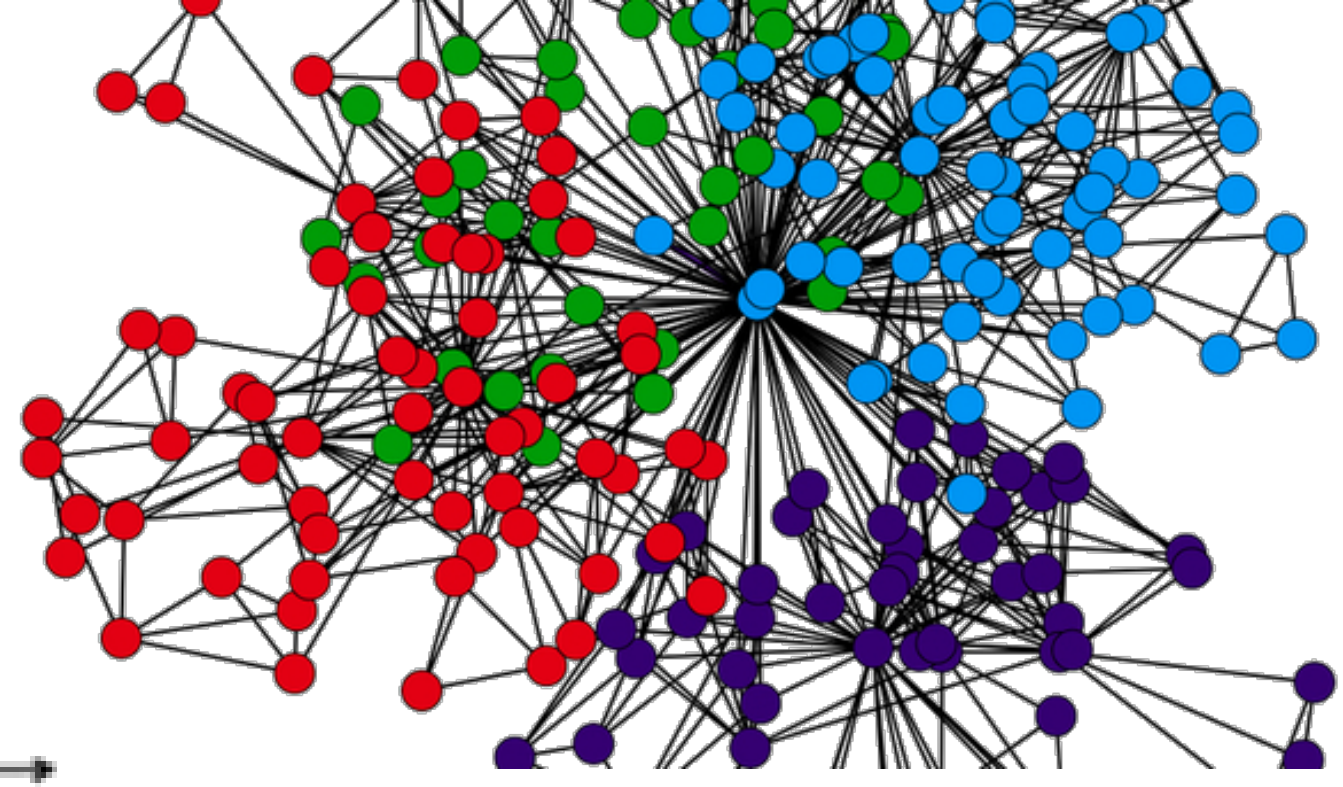
CORRELATION ⇔

सहसंबंध

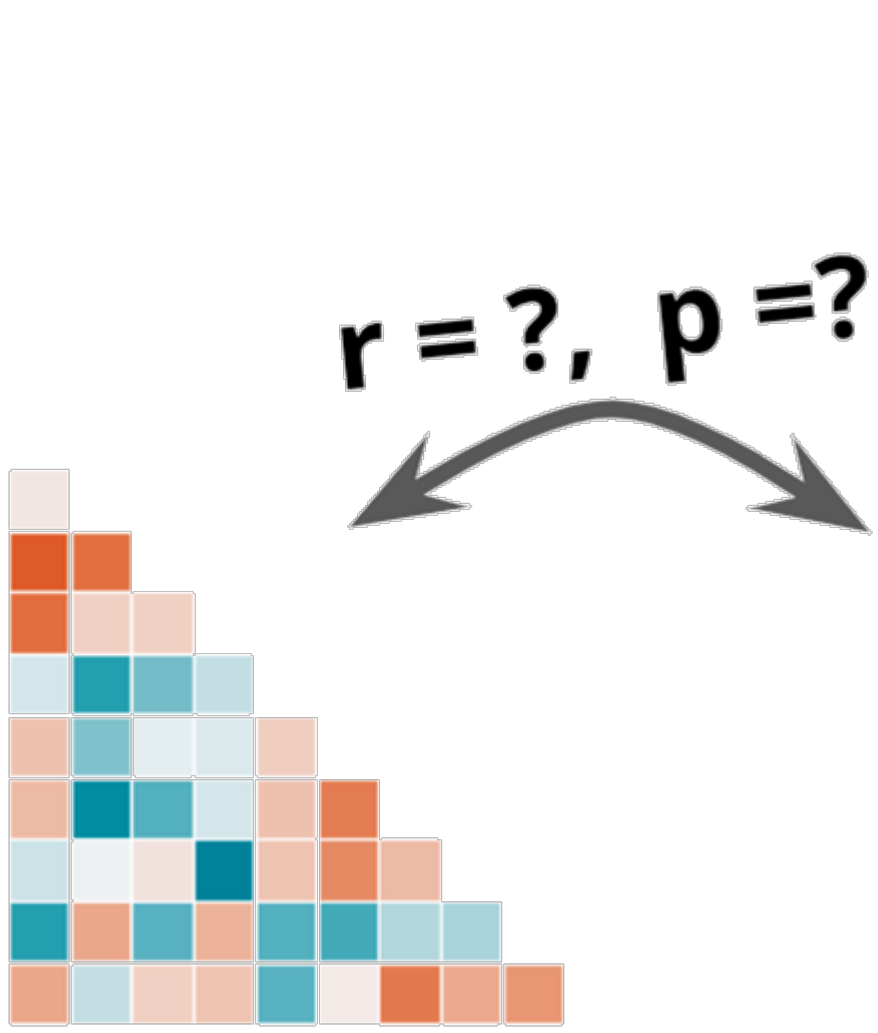
ऋणात्मक गैर–रेखीय संबंध

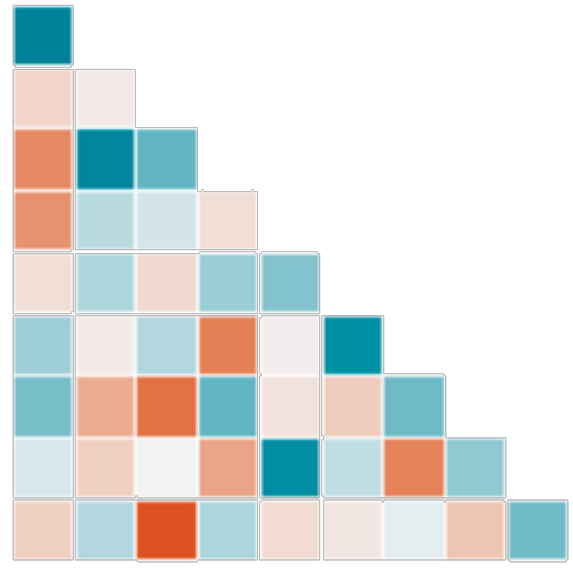
Negative non – liner relation

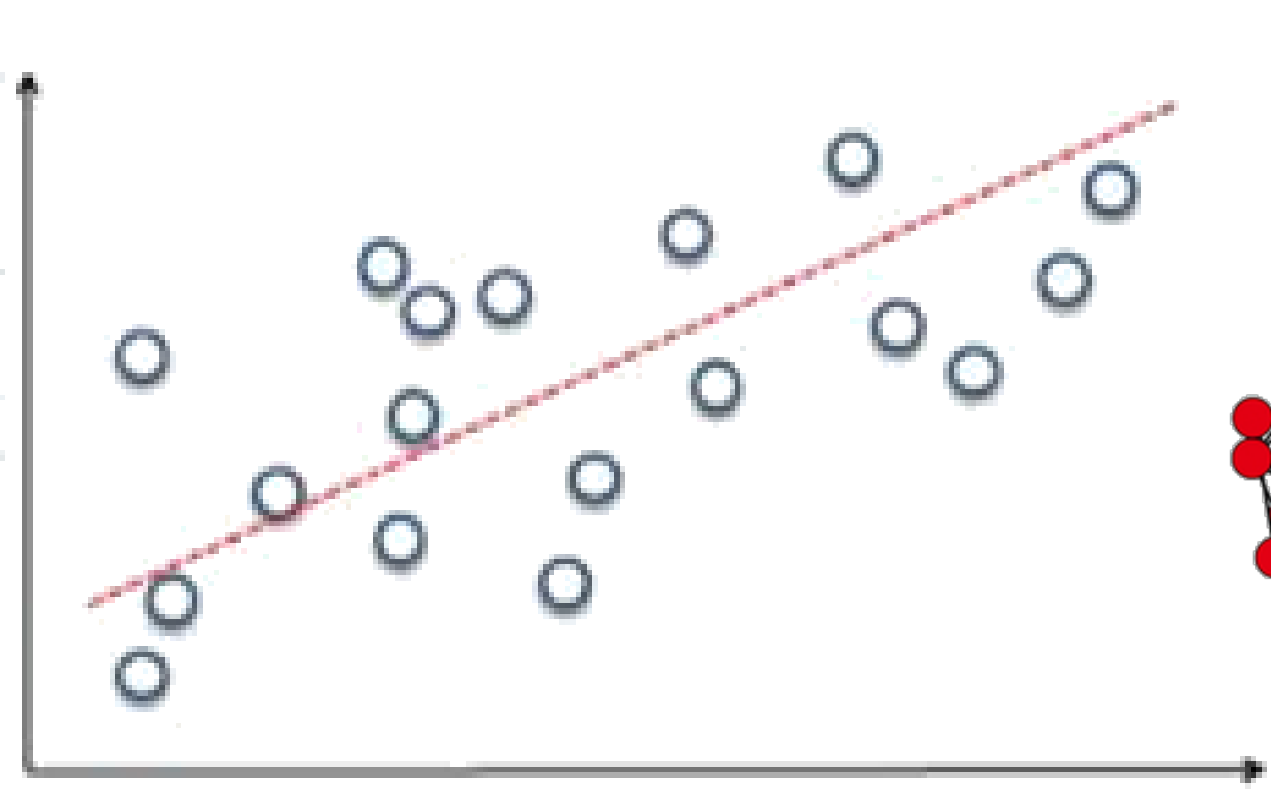


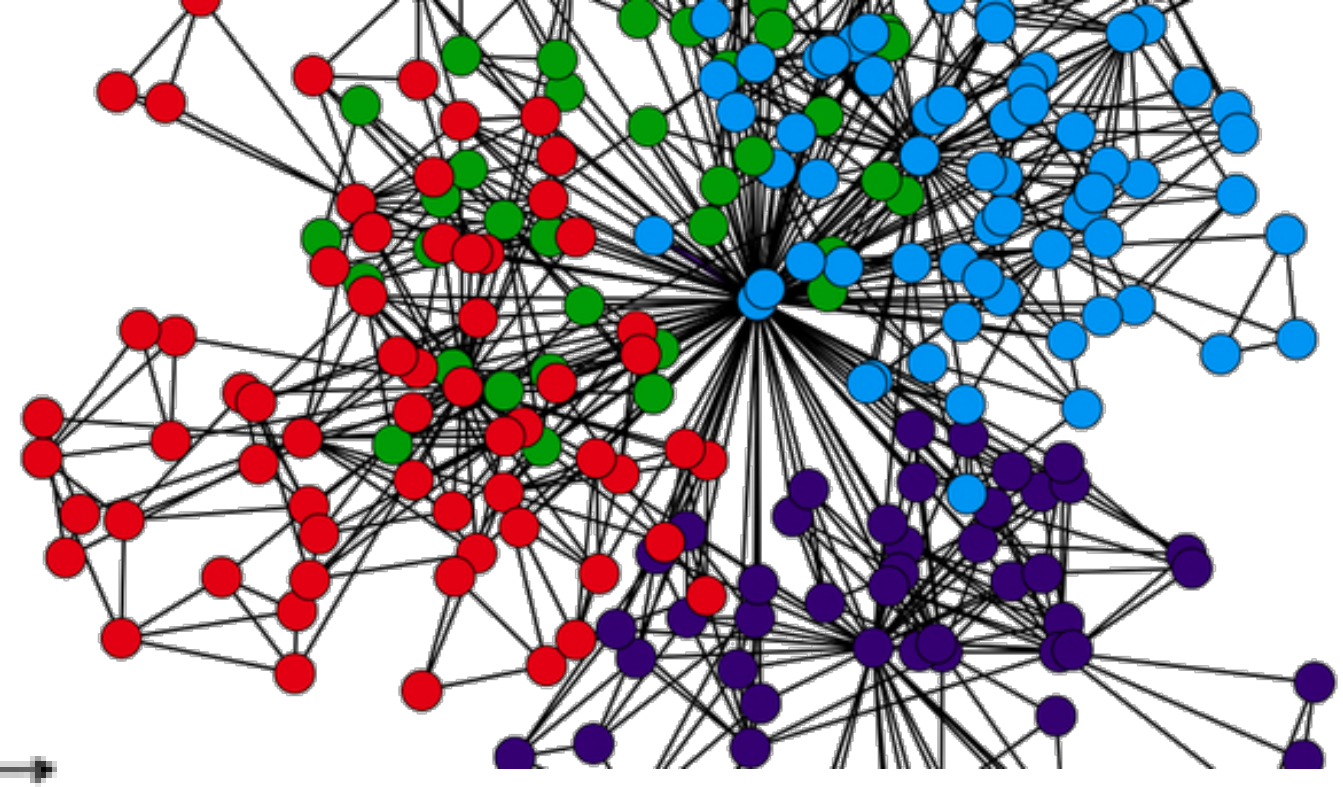


THANK YOU

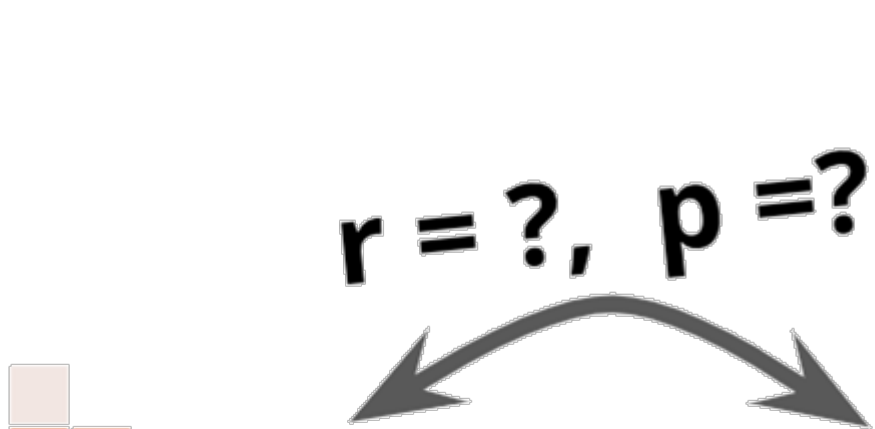


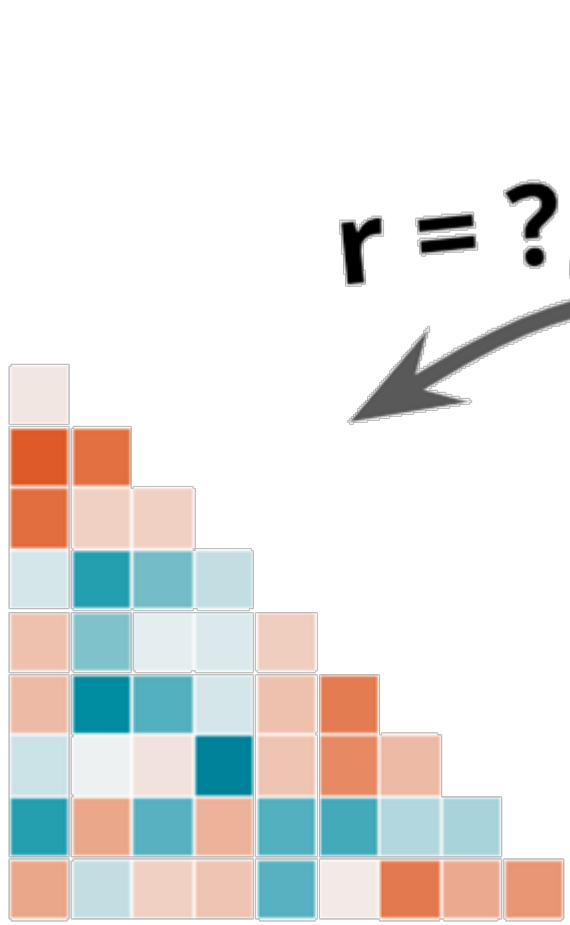






CORRELATION





सहसंबंध

- **Rank Correlation**

CORRELATION ⇔

सहसंबंध

Spearman's coefficient of correlation measures the linear association between ranks assigned to indiviual items according to their attributes. Attributes are those variables which cannot be numerically measured such as intelligence of people, physical appearance, honesty, etc.

Lih;jeSu dk lglaca/ xq.kkad O;f"Vxr enksa osQ chp muosQ xq.kksa osQ vk/kj ij fuèkkZfjr dksfV;ksa osQ }kjk js[kh; lglaca/ dks ekik tkrk gSA xq.k os pj gSa] ftudk la[;kRed ekiu laHko ugha tSls yksxksa dk ckSf¼d Lrj] 'kkjhfjd :i&jax rFkk bZekunkjh vkfnA

CORRELATION ⇔

When the ranks are given **tc oQksfV;k¡ nh xbZ gksa**

Competitors **izfr;ksxh**

Judge	1	2	3	4	5
A	1	2	3	4	5
B	2	4	1	5	3
C	1	3	5	2	4

$$r_s = 1 - \frac{6\sum D^2}{n^3 - n}$$

CORRELATION ⇔

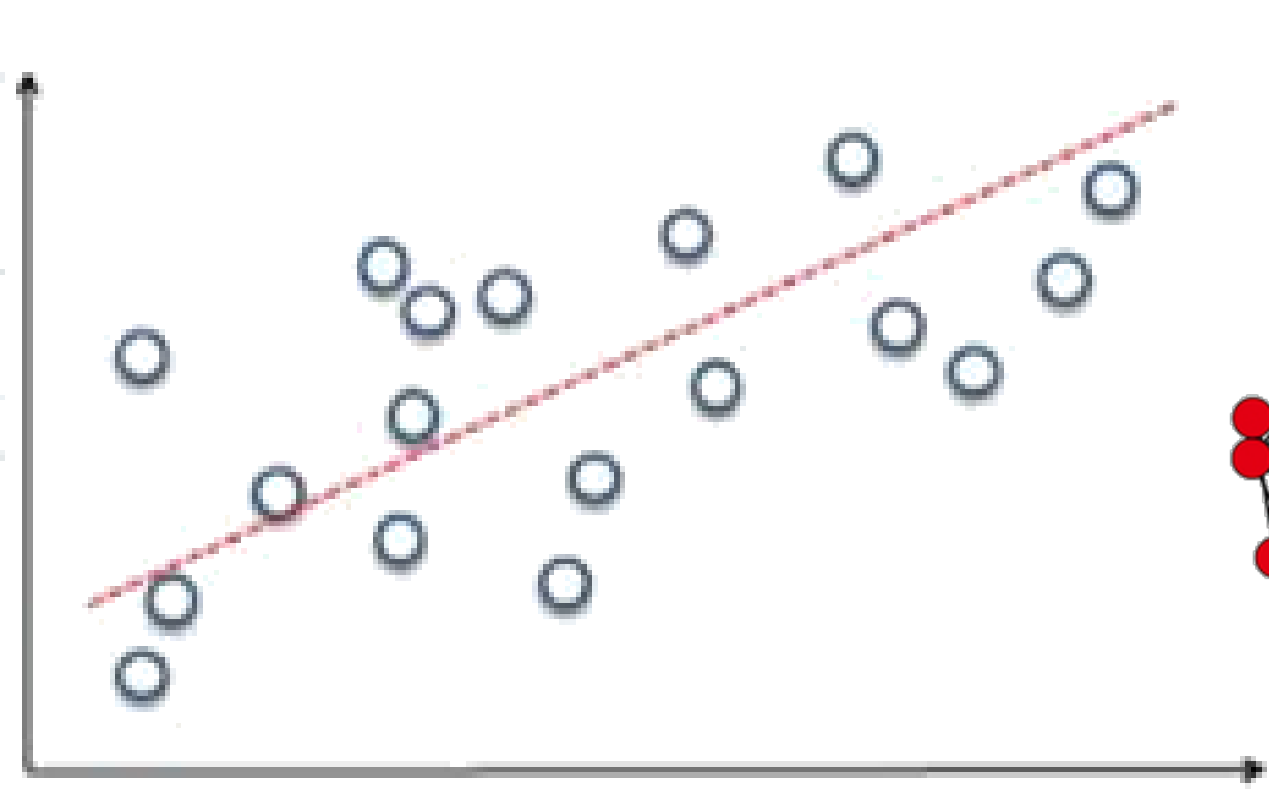
When the ranks are not given

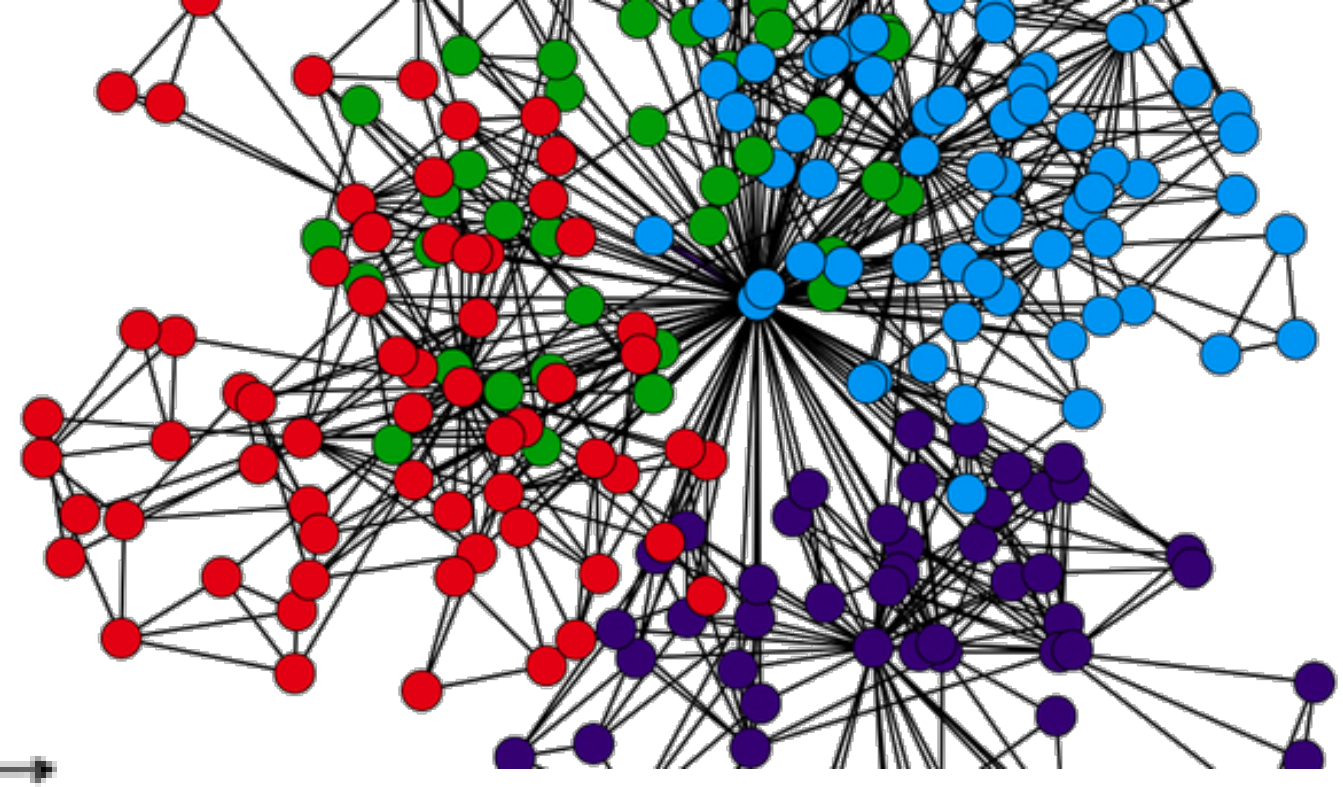
Student	Marks in Statistics (X)	Marks in Economics (y)
A	85	60
B	60	48
C	55	49
D	65	50
E	75	55

CORRELATION ⇔

When the ranks are repeated and ranks of not giv

X	Y
1200	75
1150	65
1000	50
990	100
880	90
780	85
760	90
750	40
730	50
700	60
620	50
600	75





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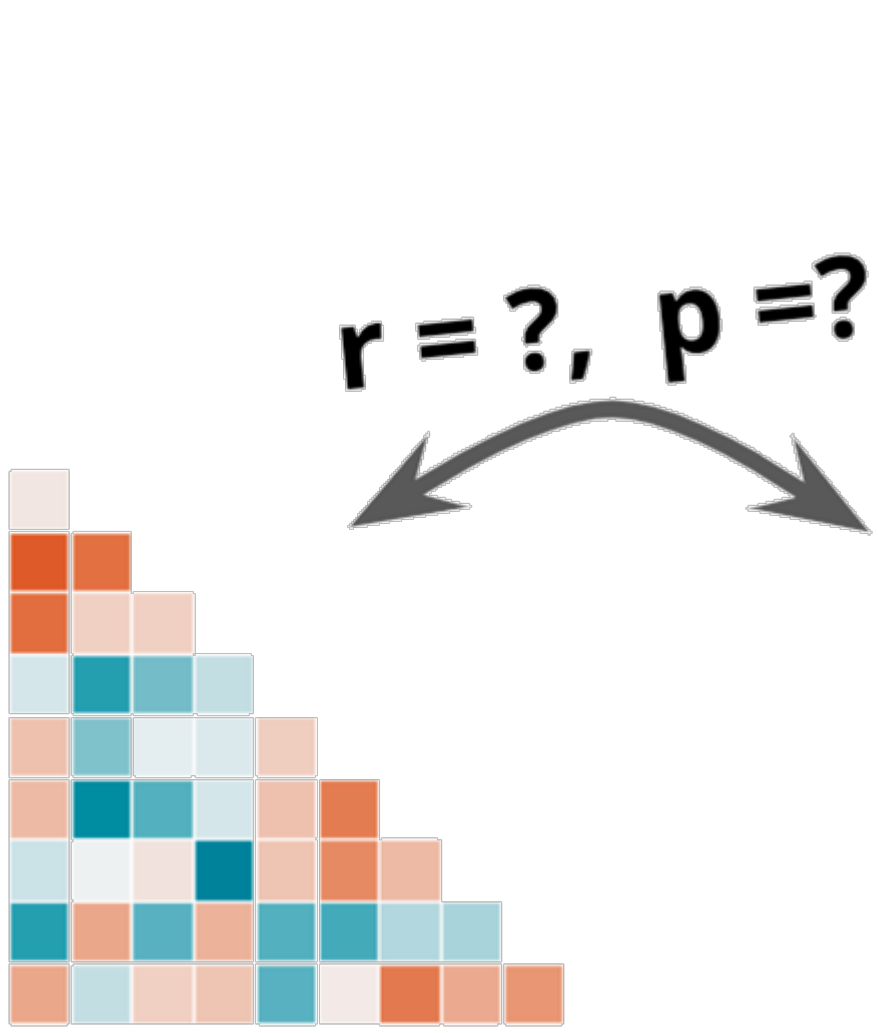
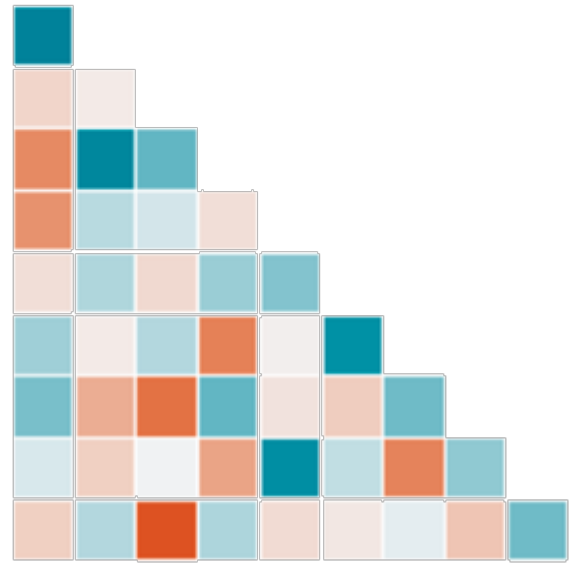
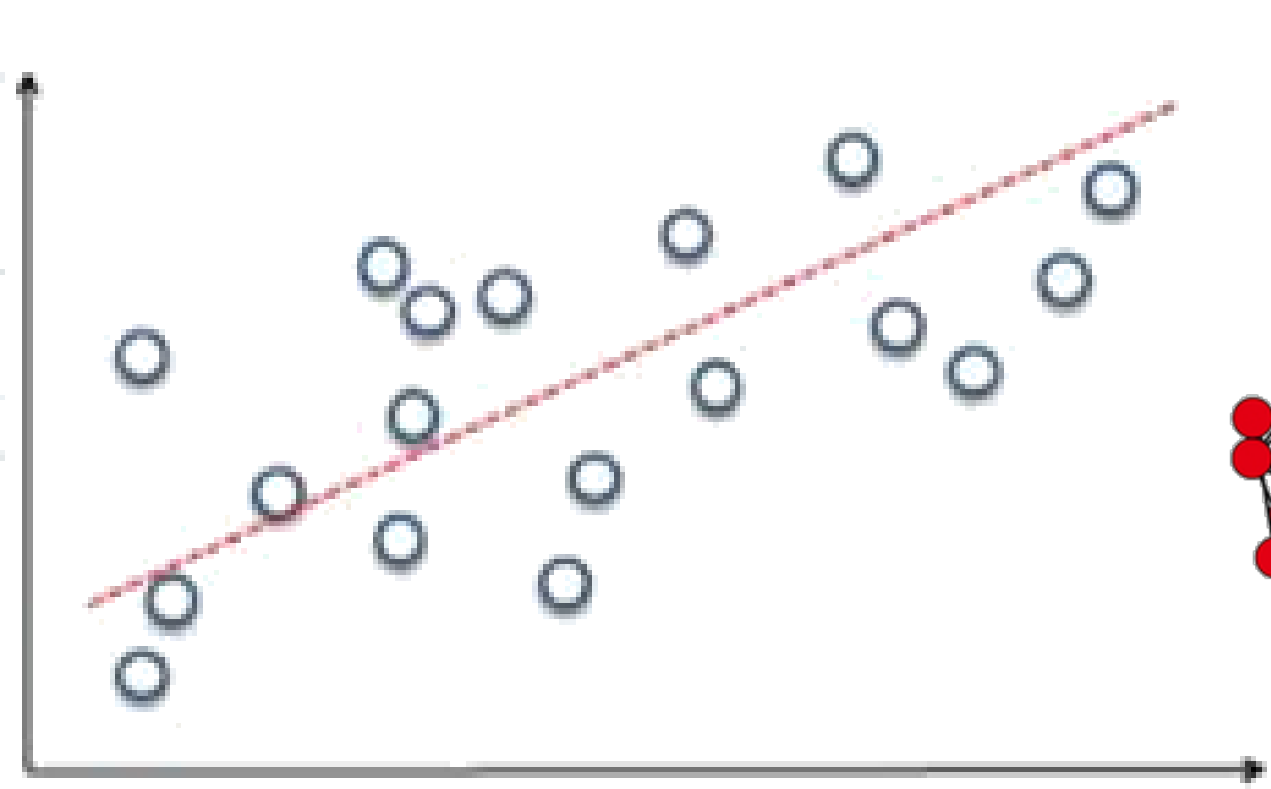
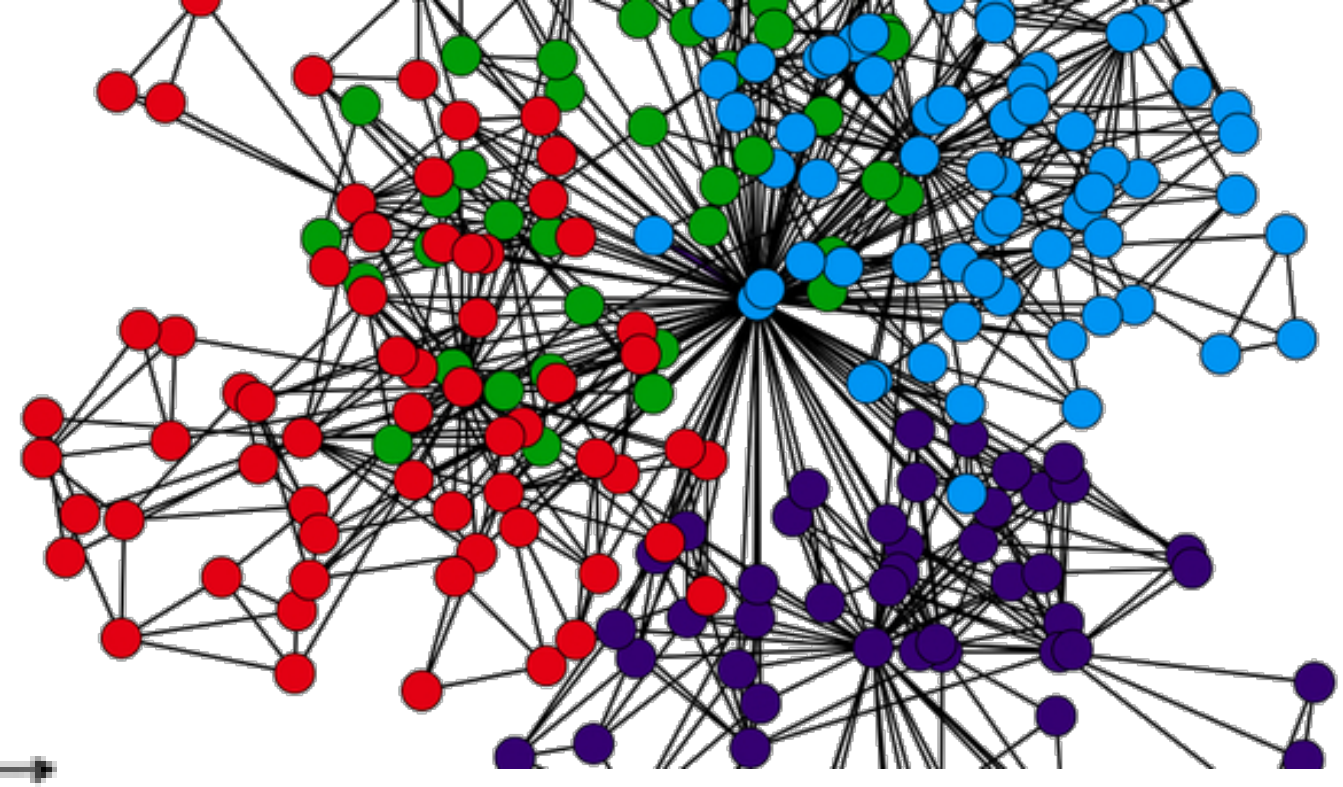
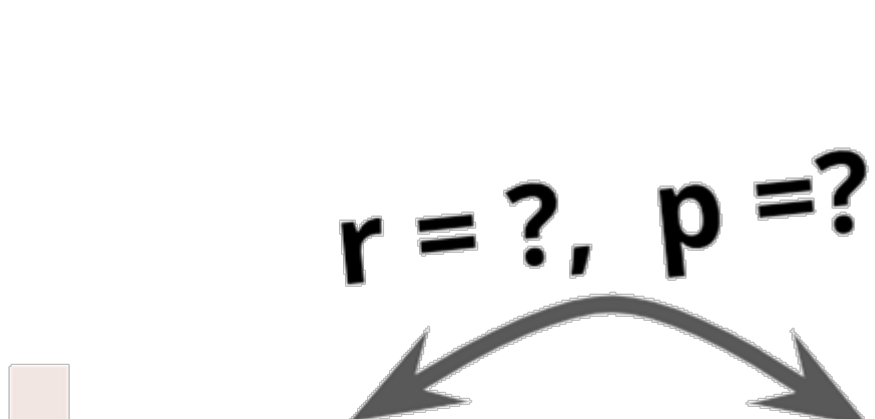


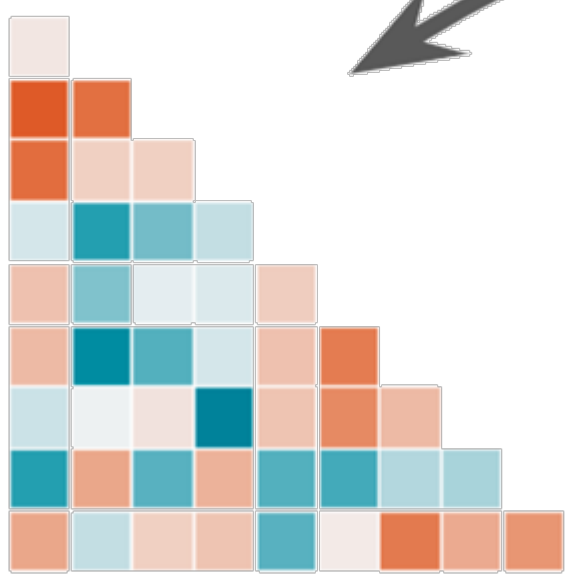


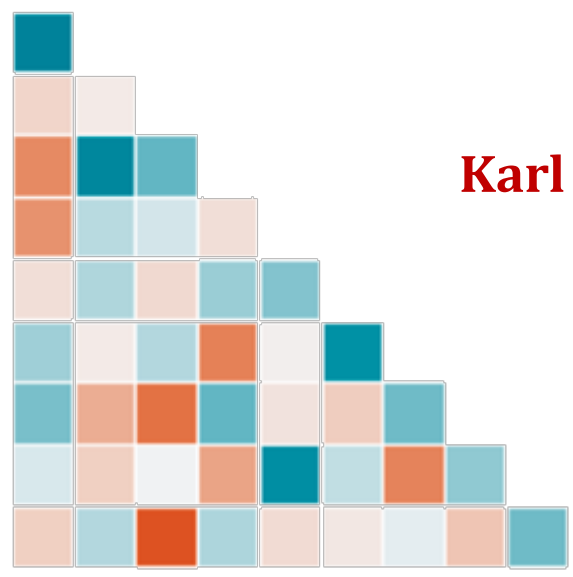




CORRELATION







सहसंबंध

Karl pearson's coefficient of correlation

CORRELATION ⇔

सहसंबंध

Karl Pearson's Coefficient of Correlation

This is also known as product moment correlation coefficient or simple correlation coefficient. It gives a precise numerical value of the degree of linear relationship between two variables X and Y.

dkyZ fi;jlu dk lglaca/ xq.kkad

bls xq.ku vk/w.kZ lglaca/ rFkk ljy lglaca/ xq.kkad osQ ukeksa ls Hkh tkuk tkrk gSA ;g nks pjksa x ,oa y osQ chp js[kh; laca/ksa osQ lgh la[;kRed eku dh dksfV n'kkZrk gSA

CORRELATION ⇔

सहसंबंध

When there is a non-linear relation between X and Y, then calculating the Karl Pearson's coefficient of correlation can be misleading.

tc x vkSj Y ds chp xSj&js[kh; laca/ gksrk gS rks dkyZ ih;jlu lglaca/ dh x.kuk Hkzked gks ldrh gSA

CORRELATION ⇔

KARL PEARSON'S CORRELATION METHOD

Direct ↓

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \Sigma y^2}}$$

Short Cut ↓

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{N}}{\sqrt{\Sigma x^2 - \frac{(\Sigma X)^2}{N}}\sqrt{\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}}}$$

Step Deviation ↓

CORRELATION ⇔

KARL PEARSON'S CORRELATION METHOD

Direct

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \Sigma y^2}}$$

X	Y
2	4
3	7
4	8
5	9
6	10
7	14
8	18

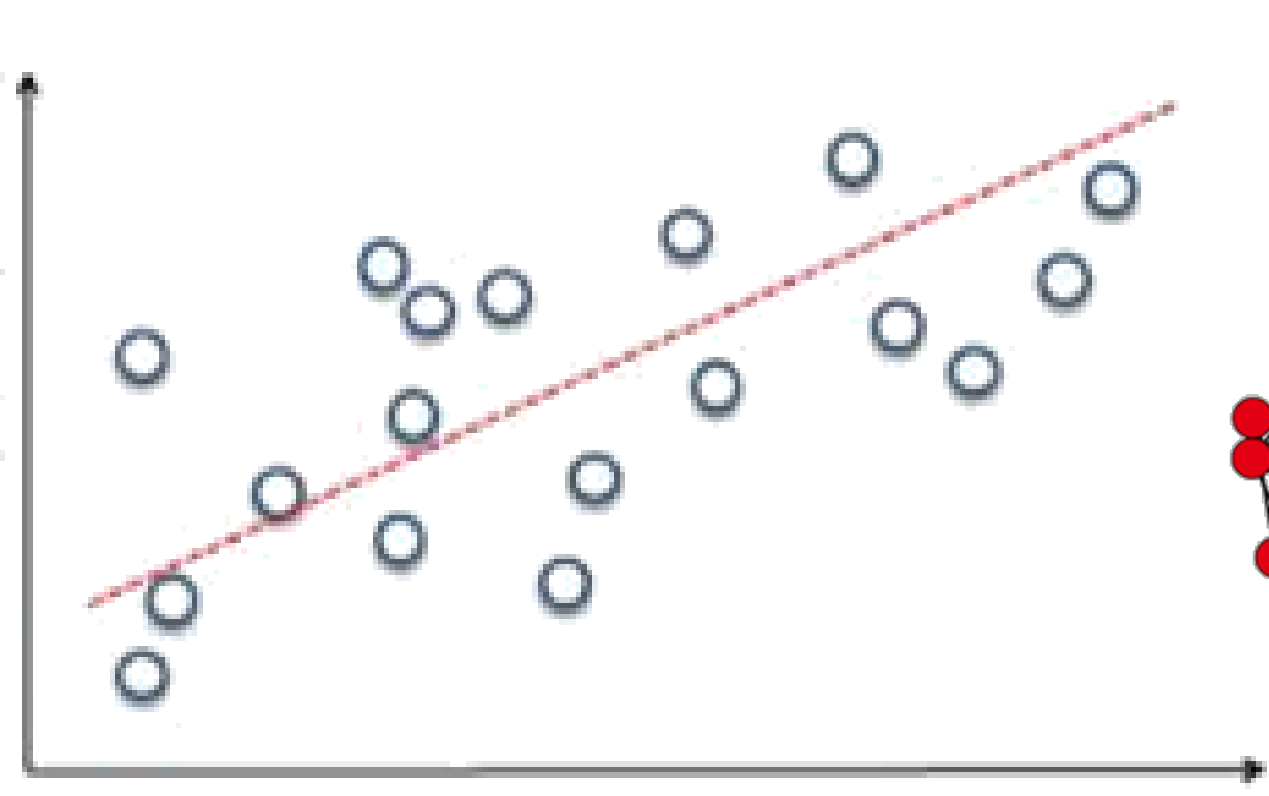
CORRELATION ⇔

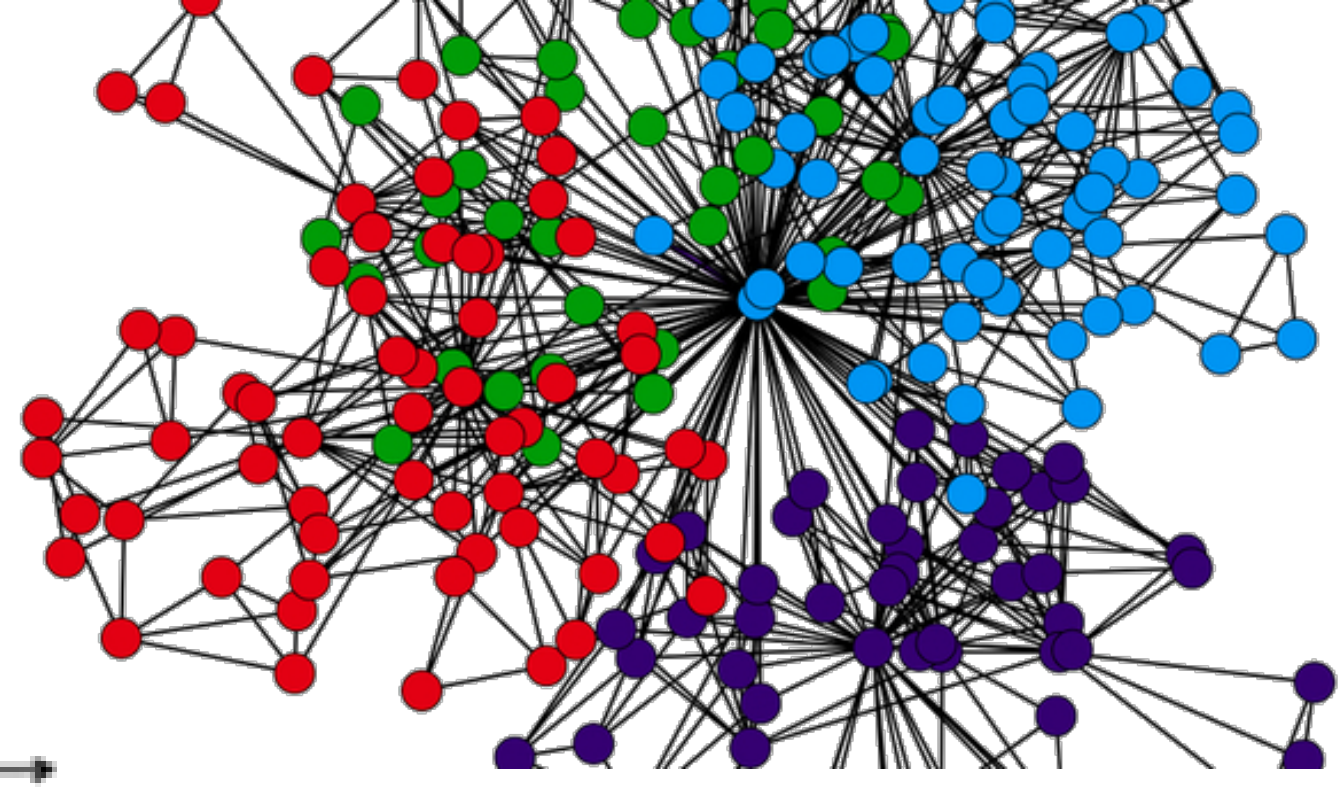
KARL PEARSON'S CORRELATION METHOD

Short Cut

$$r = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{N}}{\sqrt{\Sigma x^2 - \frac{(\Sigma x)^2}{N}}\sqrt{\Sigma y^2 - \frac{(\Sigma y)^2}{N}}}$$

X	Y
2	5
4	6
6	8
8	9
10	12





THANK YOU