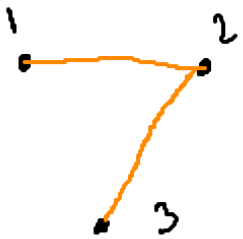
kap 21 : Grafteori

noder :



G_1

$\Rightarrow V = \{1, 2, 3\}$

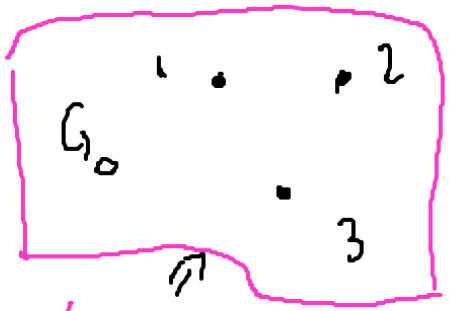
eudelig $\Rightarrow \neq \emptyset$

$\Rightarrow G_1$: $\Rightarrow V = \{1\}$

kanter : $E = \{\{1,2\}, \{2,3\}\}$

eudelig

$= \emptyset$



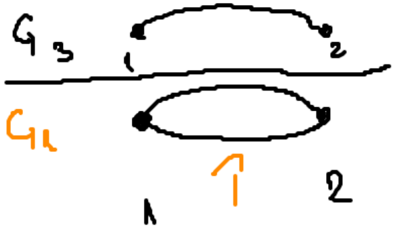
$G_0 \Rightarrow$ $E = \emptyset$, $V = \{1, 2, 3\}$

=> løkke <=> pseudograf

enkel multigraf => multigraf uten parallelle kanter

⇓

multigraf -> graf som kan ha parallelle kanter



=> parallelle kanter

multigraf med parallelle kanter

R

=> <1, 1> => ordnet par

Urettet graf

⇓

kantene -> mengder

=> <1,2>, <2,1>

⇑

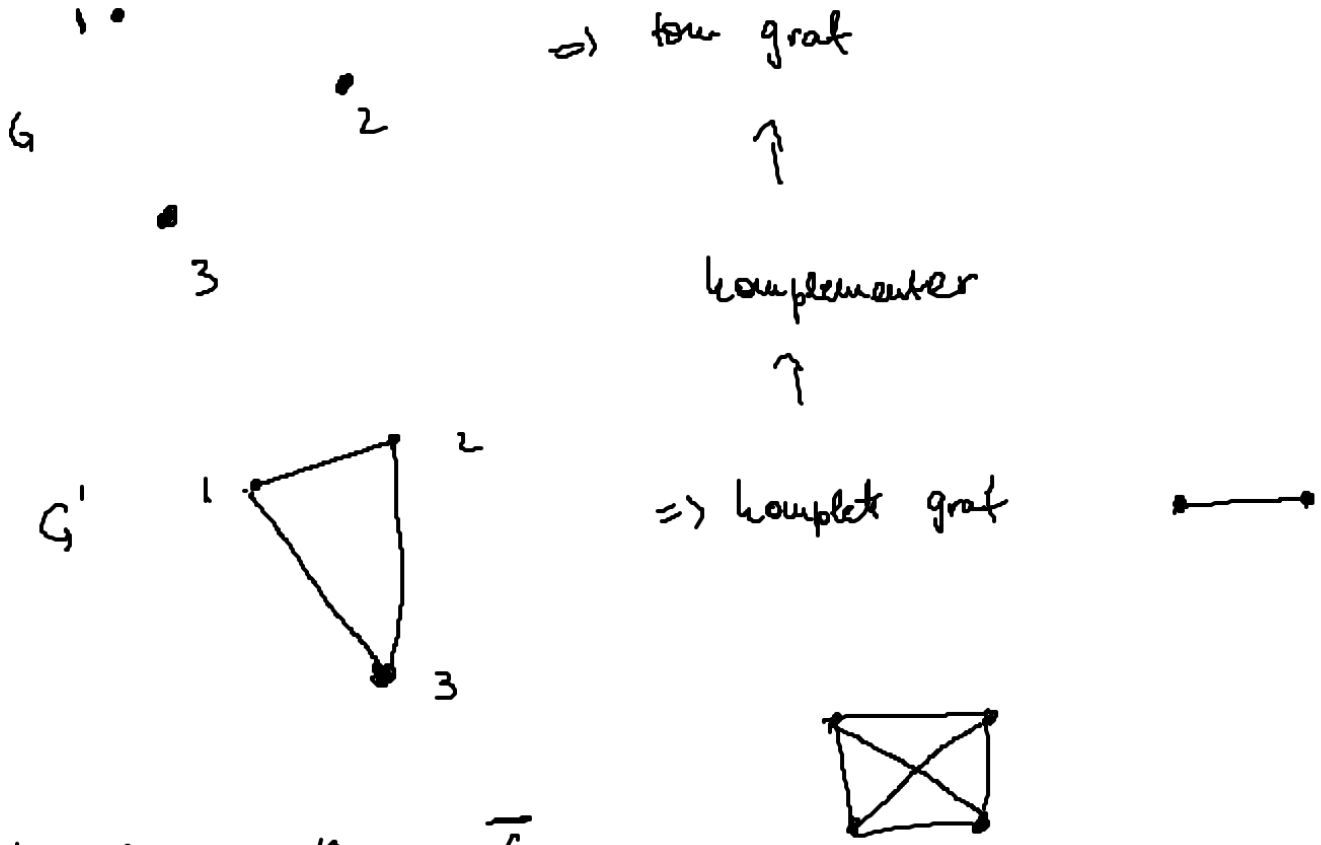
{1, 2}

Rettet graf

⇓

kantene

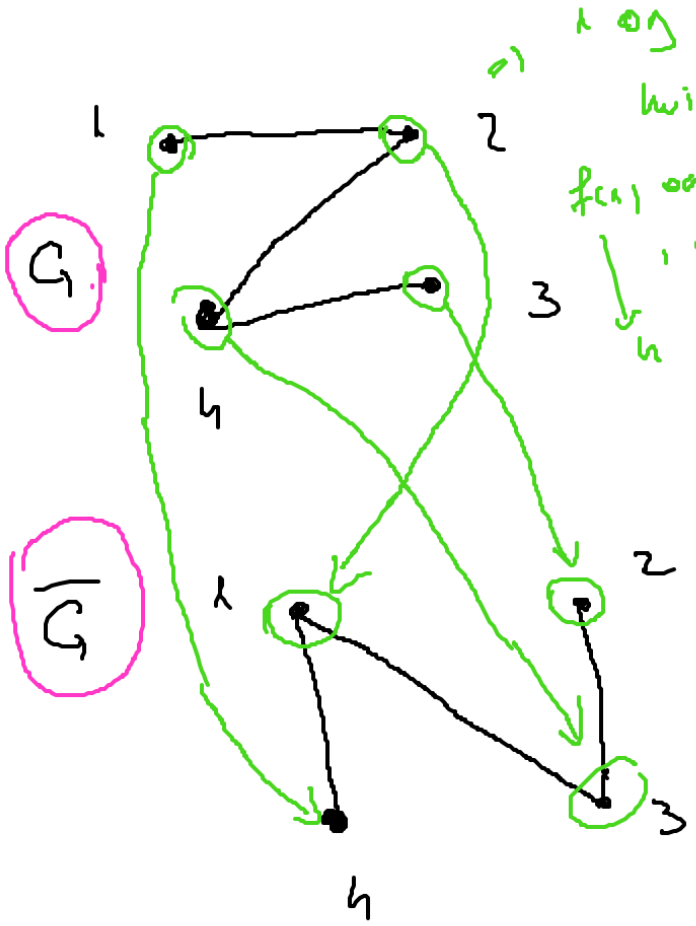
-> ordnet par



komplement: $G \rightarrow \overline{G}$

U og V
ikke
nabo

U og V
er
nabo



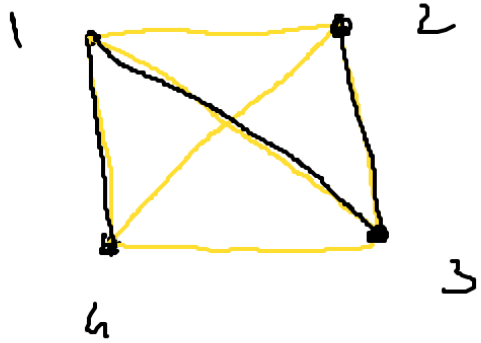
1 og 2 er naboer i G

hviss

f(1) og f(2) er naboer i H

selv-komplementær

G og $\overline{G}$ => isomorfe



Isomorfi => bijektiv funksjon fra $V(G) \to V(H)$

$\downarrow$

G og H

u og v er naboer i G

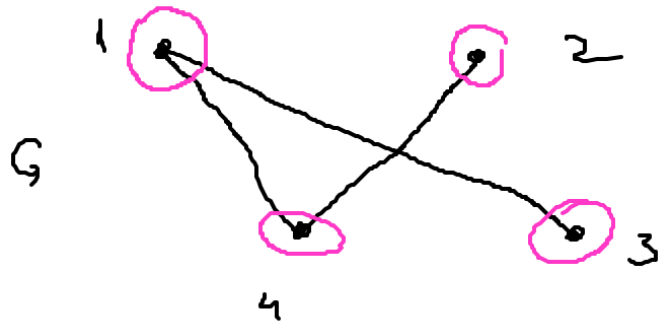
hviss

=> f(u) og f(v) er naboer i H

$f: V(G) \to V(\overline{G})$

$f(1) = 4 \quad f(3) = 2$

$f(2) = 1 \quad f(4) = 3$



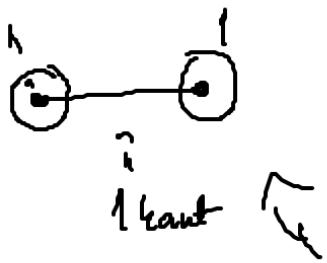
$\deg(1) = 2$

$\deg(2) = 1$

$\deg(3) = 1$

$\deg(4) = 2$

G
$\{$
$2, 3$

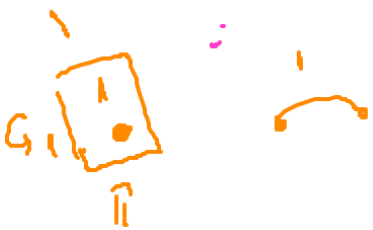


$\Rightarrow$ 1) $\sum_{v \in G} \deg(v) = 2|E|$

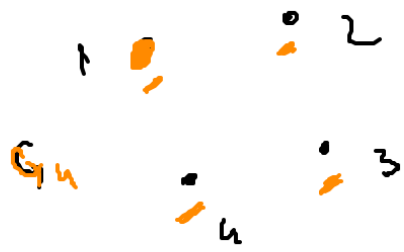
2) $\Rightarrow$ partall antall noder med odde grad.

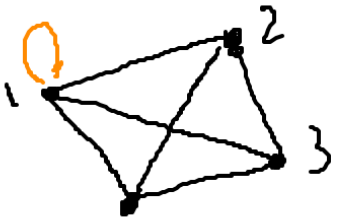
$\rightarrow$ Håndtrykklemma

21.7 $\binom{n}{2}$ kanter i en komplett graf med n noder



$\binom{1}{2} = 0$





$n = 4$

$\frac{4 \cdot 3}{2} = 6$

2 vilkårlige noder $\Rightarrow$ u og v

$\Rightarrow 4 \cdot 3$

det finnes en kant mellom dem

$\frac{1}{\uparrow}, \frac{2}{\uparrow}$

4 valg 3 valg

ulike repetisjon

2 , 1

$\Rightarrow$ $n \cdot (n-1)$

$\frac{n(n-1)}{2} = \binom{n}{2}$

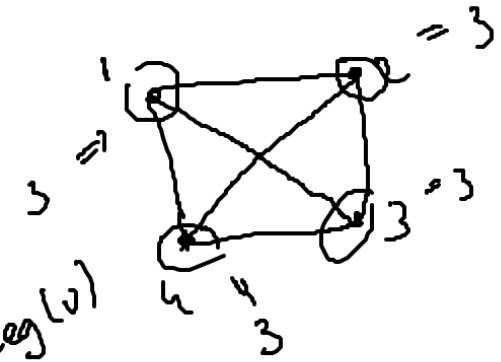
21.8 $\binom{n}{2} = \frac{n(n-1)}{2}$

$\sum_{v \in G} \deg(v) = 2|E|$

$\Rightarrow n(n-1) = 2|E|$

$|E| = \frac{n(n-1)}{2}$

$n(n-1)$



$= n$ nodes

$\deg(v) = n-1$

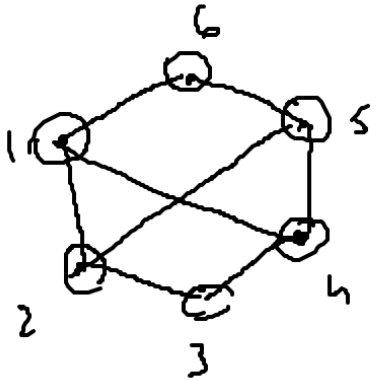
$\deg(v)$

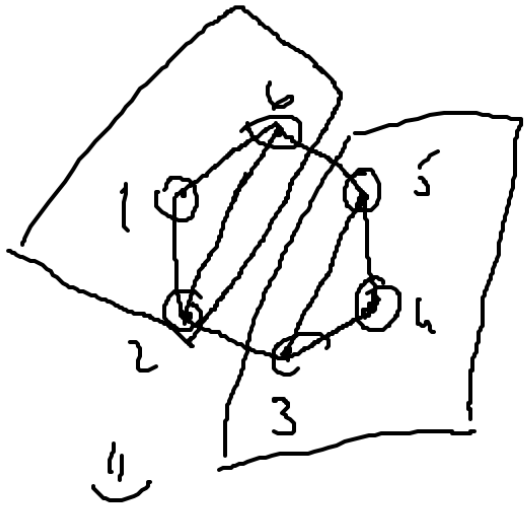
$\Downarrow$

$n(n-1) = \underbrace{(n-1) + (n-1) + \dots + (n-1)}_{n}$

21.11

i)





ii)

ano!

nabo?