Hall's Theorem



Son a giun Graph, Gro (V, E) and a osedo So OV (Goo), use de Sine -4 (or) = no. of odd componends in Gr.

M. 5 (R. U / Y : 62)

29 1 10 2 3 1 3 W 1 8 7

I am a white week and I

If a is a perfect matching, then

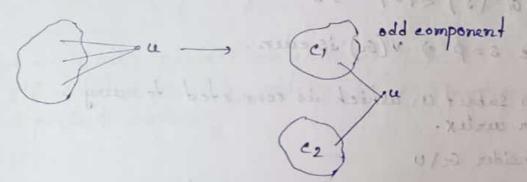
9 (a1s) < 151 \ Y S \ C V (a)

Proof or has a perfect matching let, or-u has more than two odd components.

Remoning one writex u, make two odd component.

Then total writies odd todd tu a

it always odd o hence not a perfect matching.



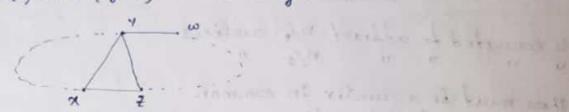
Now, Gi/s has more than sold component.

according to pigeon hade poiencipal, There must be too component adjecent to one particular westex, say V.

Then, we can consider only one. Hence, it won't be perfect matching.

50, 9 (GD) \$ 151 # SCV(G).

Theorem (tatte's Theorem) -> a has a perfect matching iff 9 (G(s) & 181 & SEV(G). Poroof (i) First part is done. (ii) 9 (or 1s) < 1s1 v sc v (or) - 9 Gr is a perfect (By contradiction) & doesn't have perteet matching.
ond & is edge maximal in perfect matching ice. Or's Guge3 has a perseet matching. 9 (01'15) < 9 (615) VS -> Gr'=Guse3 V(or) = U(Gr') then satisfied they made Or has a perfect matching or arrest about person to 9 (G1 \S) E |S| WS D take s = \$ > V(G) is even. consider a subset u, which is connected to every other westex. Now, consider Gil case (i) - G/U is a disjoint union of eliques. case (ii) - cr/v is not a disjoint union of eliques. read first to pigeon tale pair sign . They were v prairie adjusted to ensure the formation of ten au eux envidentale ens eleves : it Ven't av geg is a pertect matching M, = GU (x, 7) M2 2 GU (Y,W) F . (v, E') E' . M, DM2 F hus degree cefher 0 on 2.



Theorem (Bai teetle's Theorem) - the largest matering in a n-certex graph has size

1 [n+ min (1s1-9 (cn/s))

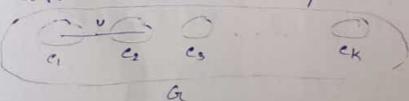
- Hayer or have have being

Hint -> Gr has a perfect matching of size K iff Gr (k) obtained by adding (n-2K) wertices have perfect matching.

Hamiltonian cycle - A coup cycle containing all the certices of the graph.

Theorem is a hamiltonian then Jos any set SSV the graph only has atmost ISI connected components.

PI let, Gals has k connected components.



Groing forom one component to another, should pass thorough a curtex.

The It brown to has n > 3 if degree (v) > n/2

then to is hamiltonian.

Pt or doesn't have a Lamiltonian eyele but

Orlocuses does where e = (us v).

an The season (book) has (5 cm) that

ce connected to atleast n/2 certices

There must be a curtex in common.

7mm it deg (ce) + dg (v) > n then graph is harrie Itonian

eint - o G has a pentient inalething of sive K

aff on (x) obtained by adding (n. ox) undiens have

and the previous of the explanation of the graph.

the said for the standard for the property of the samples and

at an is surrented surpressed to