

Reminder IX

• Vertex k -coloring : $w(x) \neq w(y)$ whenever $x \sim y$.

chromatic number $\chi(G) = \text{minimal } k$.

2 algorithms : 1) Sequential vertex-coloring
2) largest-degree first } rarely optimal

Inequalities : $W(G) \leq \chi(G) \leq \Delta(G) + 1$

\uparrow clique number \uparrow max degree

$\leftarrow +1$ only for K_n and C_n (n odd)

• Plane graph, face $f \in F(G)$, adjacent faces, size $|f|$.

Equality : $|V| - |E| + |F(G)| = 2$ for connected plane graph.

Euler



+ various inequalities \triangle have to be satisfied by planar graphs

2 important non planar graphs : $K_5, K_{3,3}$ \rightarrow Kuratowski theorem

• Loopless plane graphs are 4-colorable

• Dual graph G^* of $G \rightsquigarrow$ loop \leftrightarrow bridge

• Map and map k -coloring

4 color theorem

• No more than 4 colors for coloring any map