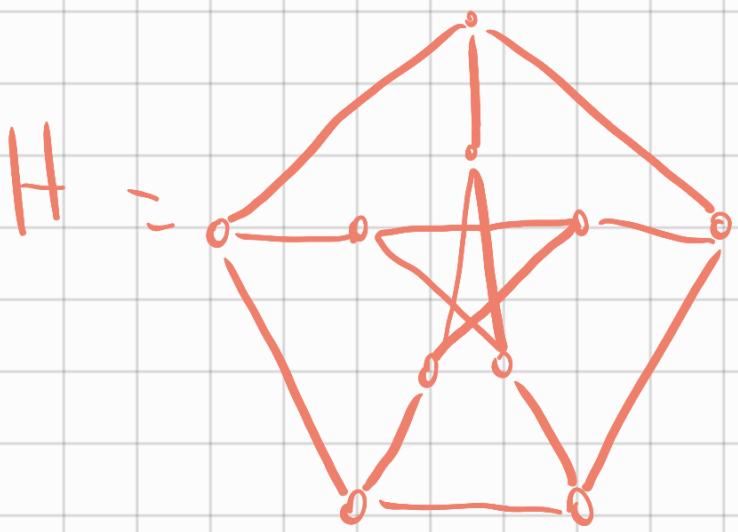
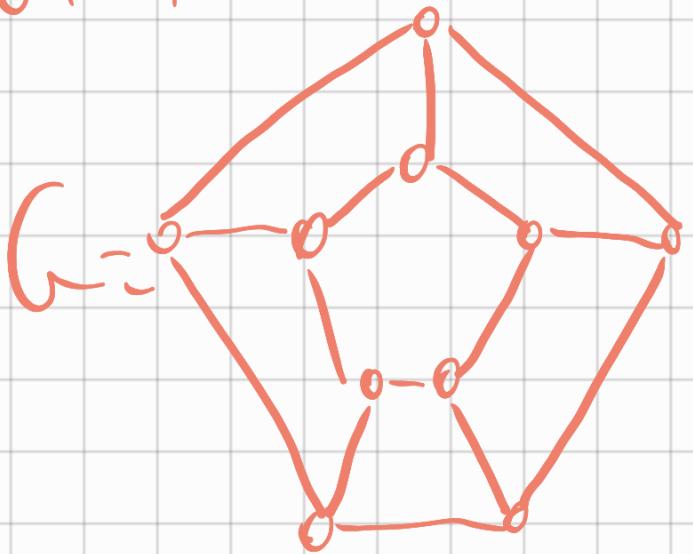


GRAFI



Sono isomorfi?

No, perché  $G$  ha cicli di

lunghezza 4, mentre  $H$  no.

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Sia  $G = ([10]^3, E)$  dove  
 $\{(a_1, a_2, a_3), (b_1, b_2, b_3)\} \in E$

$$|\{(i \in [3] : a_i \neq b_i)\}| = 1$$

$$\forall (a_1, a_2, a_3), (b_1, b_2, b_3) \in [10]^3$$

$\epsilon$  possibile colorare  $\kappa$  con 30 colori?

SAPPiamo dalla Teoria che

$$\chi(\kappa) \leq \max_{r \in V} (d(r))_{+1}$$

Quindi è possibile colorare con

$$\max_{r \in V} (d(r))_{+1} \text{ colori.}$$

$\sum_A r = (a_1, a_2, a_3) \in [10]^3$ . Allora

$$d(r) = |\{v \in V : \{r, v\} \in E\}|$$

$$= |\{(b_1, b_2, b_3) \in [10]^3 : \{(a_1, a_2, a_3), (b_1, b_2, b_3)\} \in E\}|$$

$$= |\{(b_1, b_2, b_3) \in [10]^3 : |\{(i \in [3] : a_i \neq b_i)\}| = 2\}|$$

$$= |\{(b_1, b_2, b_3) \in [10]^3 : b_1 \neq a_1, b_2 = a_2, b_3 = a_3\}|$$

$$\{((1, 1, 1), (2, 2, 2)), ((1, 1, 1), (2, 2, 3)), ((1, 1, 1), (3, 2, 2)), ((1, 1, 1), (3, 2, 3)), ((1, 1, 1), (3, 3, 2)), ((1, 1, 1), (3, 3, 3)), ((1, 1, 2), (2, 2, 2)), ((1, 1, 2), (2, 2, 3)), ((1, 1, 2), (3, 2, 2)), ((1, 1, 2), (3, 2, 3)), ((1, 1, 2), (3, 3, 2)), ((1, 1, 2), (3, 3, 3)), ((1, 1, 3), (2, 2, 2)), ((1, 1, 3), (2, 2, 3)), ((1, 1, 3), (3, 2, 2)), ((1, 1, 3), (3, 2, 3)), ((1, 1, 3), (3, 3, 2)), ((1, 1, 3), (3, 3, 3)), ((1, 2, 1), (2, 2, 2)), ((1, 2, 1), (2, 2, 3)), ((1, 2, 1), (3, 2, 2)), ((1, 2, 1), (3, 2, 3)), ((1, 2, 1), (3, 3, 2)), ((1, 2, 1), (3, 3, 3)), ((1, 2, 2), (2, 2, 2)), ((1, 2, 2), (2, 2, 3)), ((1, 2, 2), (3, 2, 2)), ((1, 2, 2), (3, 2, 3)), ((1, 2, 2), (3, 3, 2)), ((1, 2, 2), (3, 3, 3)), ((1, 2, 3), (2, 2, 2)), ((1, 2, 3), (2, 2, 3)), ((1, 2, 3), (3, 2, 2)), ((1, 2, 3), (3, 2, 3)), ((1, 2, 3), (3, 3, 2)), ((1, 2, 3), (3, 3, 3)), ((1, 3, 1), (2, 2, 2)), ((1, 3, 1), (2, 2, 3)), ((1, 3, 1), (3, 2, 2)), ((1, 3, 1), (3, 2, 3)), ((1, 3, 1), (3, 3, 2)), ((1, 3, 1), (3, 3, 3)), ((1, 3, 2), (2, 2, 2)), ((1, 3, 2), (2, 2, 3)), ((1, 3, 2), (3, 2, 2)), ((1, 3, 2), (3, 2, 3)), ((1, 3, 2), (3, 3, 2)), ((1, 3, 2), (3, 3, 3)), ((1, 3, 3), (2, 2, 2)), ((1, 3, 3), (2, 2, 3)), ((1, 3, 3), (3, 2, 2)), ((1, 3, 3), (3, 2, 3)), ((1, 3, 3), (3, 3, 2)), ((1, 3, 3), (3, 3, 3)), ((2, 1, 1), (2, 2, 2)), ((2, 1, 1), (2, 2, 3)), ((2, 1, 1), (3, 2, 2)), ((2, 1, 1), (3, 2, 3)), ((2, 1, 1), (3, 3, 2)), ((2, 1, 1), (3, 3, 3)), ((2, 1, 2), (2, 2, 2)), ((2, 1, 2), (2, 2, 3)), ((2, 1, 2), (3, 2, 2)), ((2, 1, 2), (3, 2, 3)), ((2, 1, 2), (3, 3, 2)), ((2, 1, 2), (3, 3, 3)), ((2, 1, 3), (2, 2, 2)), ((2, 1, 3), (2, 2, 3)), ((2, 1, 3), (3, 2, 2)), ((2, 1, 3), (3, 2, 3)), ((2, 1, 3), (3, 3, 2)), ((2, 1, 3), (3, 3, 3)), ((2, 2, 1), (2, 2, 2)), ((2, 2, 1), (2, 2, 3)), ((2, 2, 1), (3, 2, 2)), ((2, 2, 1), (3, 2, 3)), ((2, 2, 1), (3, 3, 2)), ((2, 2, 1), (3, 3, 3)), ((2, 2, 2), (2, 2, 2)), ((2, 2, 2), (2, 2, 3)), ((2, 2, 2), (3, 2, 2)), ((2, 2, 2), (3, 2, 3)), ((2, 2, 2), (3, 3, 2)), ((2, 2, 2), (3, 3, 3)), ((2, 2, 3), (2, 2, 2)), ((2, 2, 3), (2, 2, 3)), ((2, 2, 3), (3, 2, 2)), ((2, 2, 3), (3, 2, 3)), ((2, 2, 3), (3, 3, 2)), ((2, 2, 3), (3, 3, 3)), ((2, 3, 1), (2, 2, 2)), ((2, 3, 1), (2, 2, 3)), ((2, 3, 1), (3, 2, 2)), ((2, 3, 1), (3, 2, 3)), ((2, 3, 1), (3, 3, 2)), ((2, 3, 1), (3, 3, 3)), ((2, 3, 2), (2, 2, 2)), ((2, 3, 2), (2, 2, 3)), ((2, 3, 2), (3, 2, 2)), ((2, 3, 2), (3, 2, 3)), ((2, 3, 2), (3, 3, 2)), ((2, 3, 2), (3, 3, 3)), ((2, 3, 3), (2, 2, 2)), ((2, 3, 3), (2, 2, 3)), ((2, 3, 3), (3, 2, 2)), ((2, 3, 3), (3, 2, 3)), ((2, 3, 3), (3, 3, 2)), ((2, 3, 3), (3, 3, 3)), ((3, 1, 1), (2, 2, 2)), ((3, 1, 1), (2, 2, 3)), ((3, 1, 1), (3, 2, 2)), ((3, 1, 1), (3, 2, 3)), ((3, 1, 1), (3, 3, 2)), ((3, 1, 1), (3, 3, 3)), ((3, 1, 2), (2, 2, 2)), ((3, 1, 2), (2, 2, 3)), ((3, 1, 2), (3, 2, 2)), ((3, 1, 2), (3, 2, 3)), ((3, 1, 2), (3, 3, 2)), ((3, 1, 2), (3, 3, 3)), ((3, 1, 3), (2, 2, 2)), ((3, 1, 3), (2, 2, 3)), ((3, 1, 3), (3, 2, 2)), ((3, 1, 3), (3, 2, 3)), ((3, 1, 3), (3, 3, 2)), ((3, 1, 3), (3, 3, 3)), ((3, 2, 1), (2, 2, 2)), ((3, 2, 1), (2, 2, 3)), ((3, 2, 1), (3, 2, 2)), ((3, 2, 1), (3, 2, 3)), ((3, 2, 1), (3, 3, 2)), ((3, 2, 1), (3, 3, 3)), ((3, 2, 2), (2, 2, 2)), ((3, 2, 2), (2, 2, 3)), ((3, 2, 2), (3, 2, 2)), ((3, 2, 2), (3, 2, 3)), ((3, 2, 2), (3, 3, 2)), ((3, 2, 2), (3, 3, 3)), ((3, 2, 3), (2, 2, 2)), ((3, 2, 3), (2, 2, 3)), ((3, 2, 3), (3, 2, 2)), ((3, 2, 3), (3, 2, 3)), ((3, 2, 3), (3, 3, 2)), ((3, 2, 3), (3, 3, 3)), ((3, 3, 1), (2, 2, 2)), ((3, 3, 1), (2, 2, 3)), ((3, 3, 1), (3, 2, 2)), ((3, 3, 1), (3, 2, 3)), ((3, 3, 1), (3, 3, 2)), ((3, 3, 1), (3, 3, 3)), ((3, 3, 2), (2, 2, 2)), ((3, 3, 2), (2, 2, 3)), ((3, 3, 2), (3, 2, 2)), ((3, 3, 2), (3, 2, 3)), ((3, 3, 2), (3, 3, 2)), ((3, 3, 2), (3, 3, 3)), ((3, 3, 3), (2, 2, 2)), ((3, 3, 3), (2, 2, 3)), ((3, 3, 3), (3, 2, 2)), ((3, 3, 3), (3, 2, 3)), ((3, 3, 3), (3, 3, 2)), ((3, 3, 3), (3, 3, 3)))$$

$$\{(b_1, b_2, b_3) \in [10]^3 : b_1 = a_1, b_2 \neq a_2, b_3 = a_3\}$$

$$\{(b_1, b_2, b_3) \in [10]^3 : b_1 = a_1, b_2 = a_2, b_3 \neq a_3\}$$

$$= |\{(b_1, b_2, b_3) \in [10]^3 : b_1 \neq a_1, b_2 = a_2, b_3 = a_3\}| +$$

$$|\{(b_1, b_2, b_3) \in [10]^3 : b_1 = a_1, b_2 \neq a_2, b_3 = a_3\}| +$$

$$|\{(b_1, b_2, b_3) \in [10]^3 : b_1 = a_1, b_2 = a_2, b_3 \neq a_3\}|$$

$$= 9 + 9 + 9 = 27$$

Quindi  $\nu((v)) = 27$ .  $M_2 \sim \delta$

Dualità  $\Rightarrow d(u) = 27 \quad \forall u \in V$ .

Poniamo

$$\max_{u \in V} \{d(u)\} + 1 = 27 + 1 = 28$$

Quindi  $\chi(G) \leq 28 \rightarrow G \text{ es}$

Colorazione critica con 28 colori

$\vdash \approx^{\text{def}} \text{Circ}$

Sia  $G = (V, E)$  un grafo bipartito

ove:  $V = A \cup B$ ,  $A \cap B$  sono

insiemi disgiunti, definito perciò

$$A = \{v_i \mid i \in \{1, \dots, n\}\}$$

$$B = \{v_j \mid j \in \{1, \dots, m\}\}$$

( $n \in \mathbb{N}$ ,  $m \geq 1$ ),  $E$  si v.

$$\{(x, y) \mid x \in A, y \in B\} \subseteq E \Leftrightarrow x \in A \text{ e } y \in B$$

$\forall x \in A \vdash \forall y \in B$ , si dice

se  $x$  è un accoppiamento di

$A$  in  $B$

Sappiamo dalla definizione che

$$d(x) \geq d(y)$$

$\Rightarrow f$  un accoppiat.

$$\forall x \in A \vdash \forall y \in B$$

$\Rightarrow$  di  $A$  in  $B$

$\neg S_{1,2} \quad x \in A \Rightarrow x \subseteq [n] \Leftrightarrow |x| = 2$

Quer  $\sim_{1,1}$

$$d(x) = |\{y \in B : \{x, y\} \in C\}|$$

$$= |\{y \in B : |y| = 3, y \supseteq x\}|$$

$$\approx n - 2$$

$\neg S_{1,1} \quad y \in B \Rightarrow y \subseteq [n] \Leftrightarrow |y| = 3$

Quer  $\sim_{1,1}$

$$d(y) = |\{x \in A : \{x, y\} \in C\}|$$

$$= |\{x \subseteq [n] : |x| = 2, x \subseteq y\}|$$

$$= |\{x \subseteq y : |x| = 2\}|$$

$$= \binom{3}{2} = 3$$

$P_{\text{FRT} \sim \text{rto}} \quad d(x) = \frac{n-2}{n-2} \geq 3 = d(y)$

$\forall x \in A \quad \exists y \in B \Rightarrow \text{CISI SR}$

$\cup$   $\cap$   $\setminus$   $\subseteq$   $\in$   $\sim$   $\cap$   $\cup$   $\setminus$   $\in$   $\sim$   $\subseteq$

