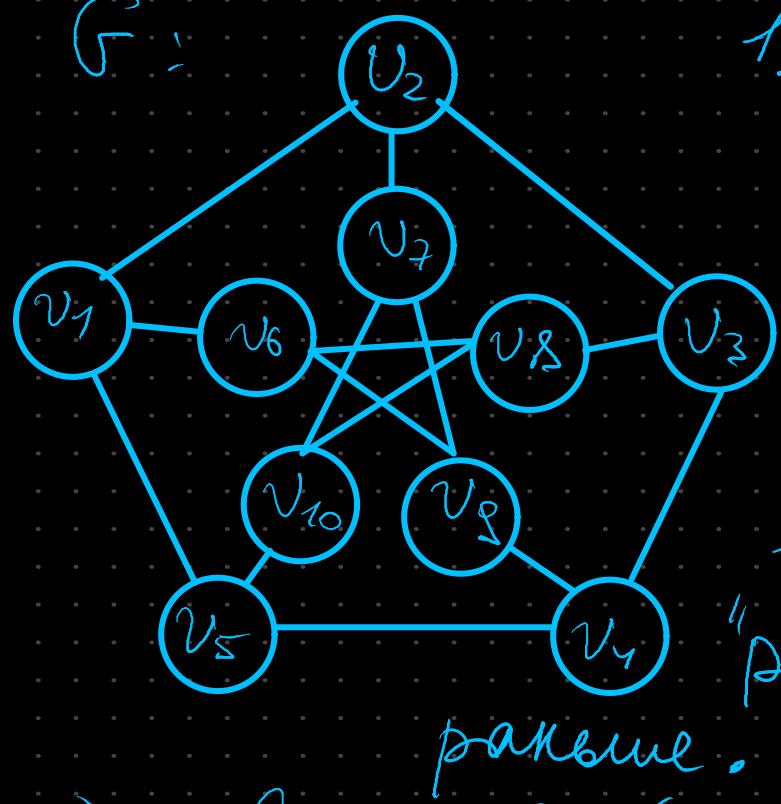


- 1) Поморские кеохори и их
породы на страницах 2 - 31
- 2) Текущие изменения формации на
страницах 32 - 36
- 3) Выборчиковка на
страницах 37 - 50
- 4) Омбенса на странице 51

$G:$

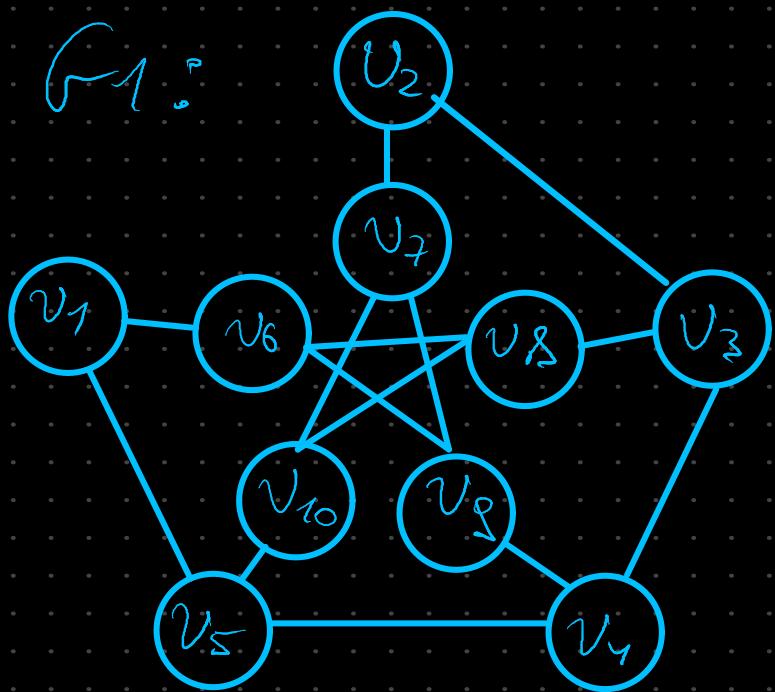


1) Если использовать
метод Фортуны,
то количество
перестановок
 $2^{|E|} = 32768$
имеющихся, можно
в данном случае
закончить
рано.

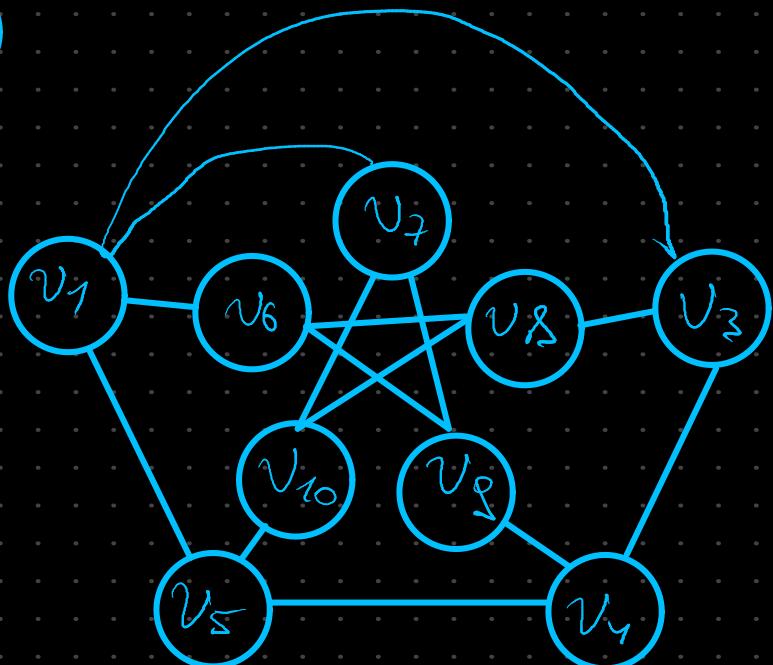
$$t) \quad G_1 = G \setminus \{e\}, \quad G_2 = G / \{e\}$$

$$e = (v_1, v_2)$$

$G_1:$



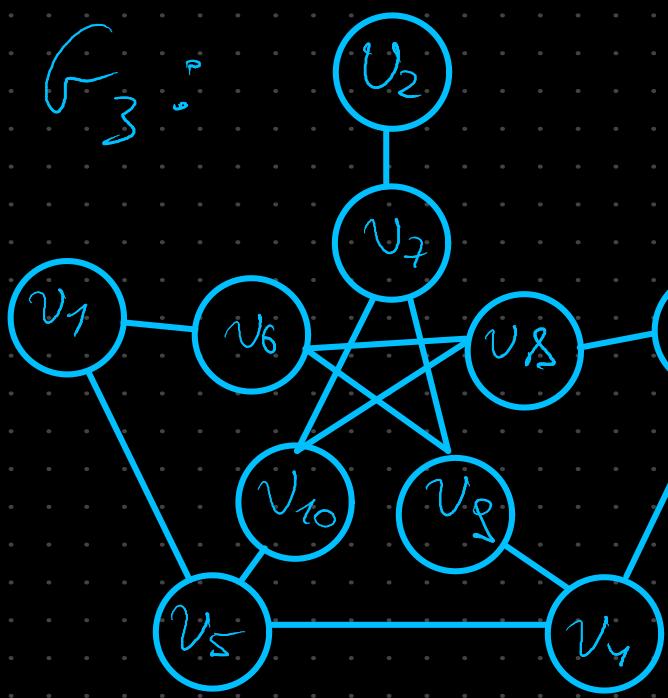
$G_2:$



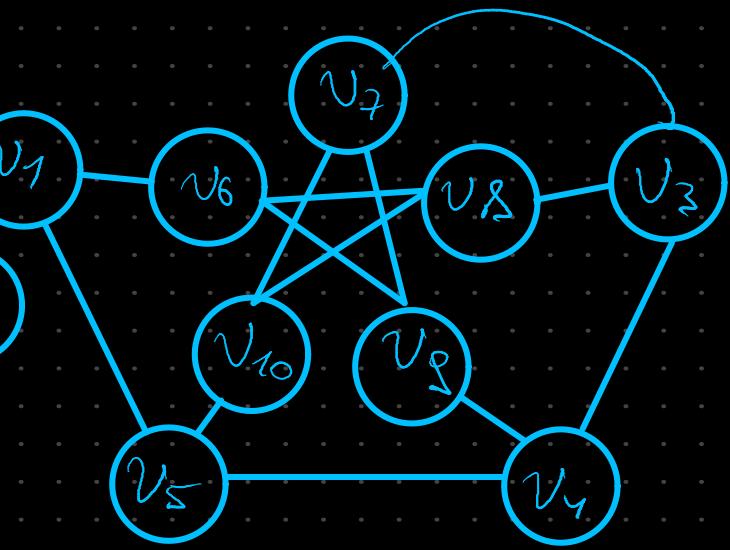
$$G_3 = G_1 / \{e\}, \quad G_4 = G_1 \setminus \{e\}$$

$$e = (v_2, v_3)$$

$$G_3:$$



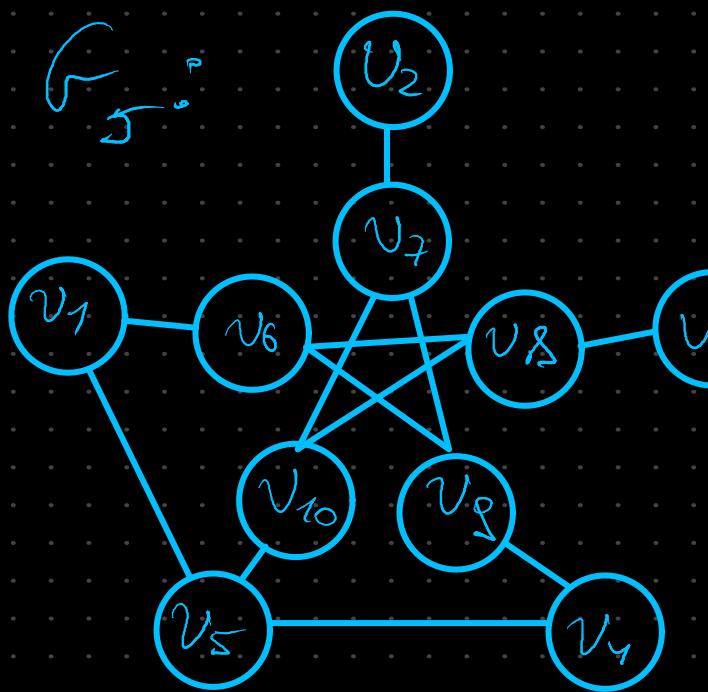
$$G_4:$$



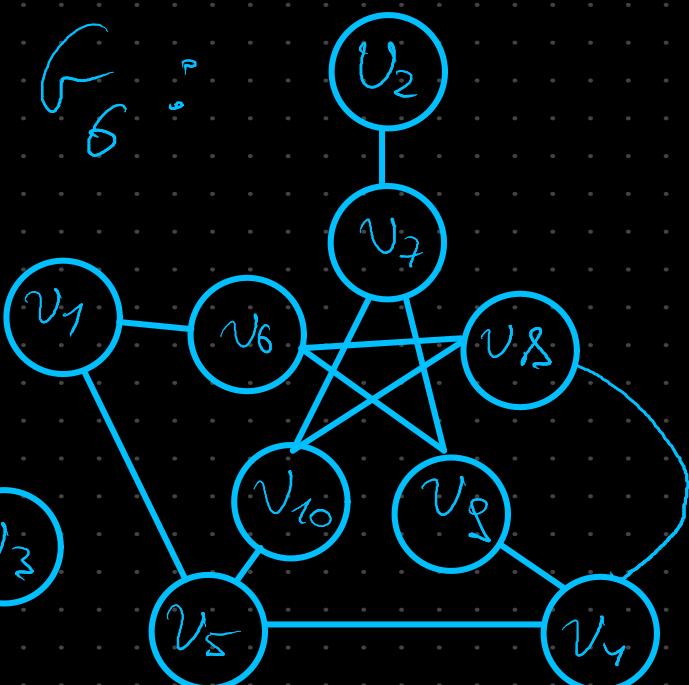
$$G_5 = G_3 \setminus \{e\}, \quad G_6 = G_3 / \{e\}$$

$$e = (v_3, v_4)$$

$$G_6:$$

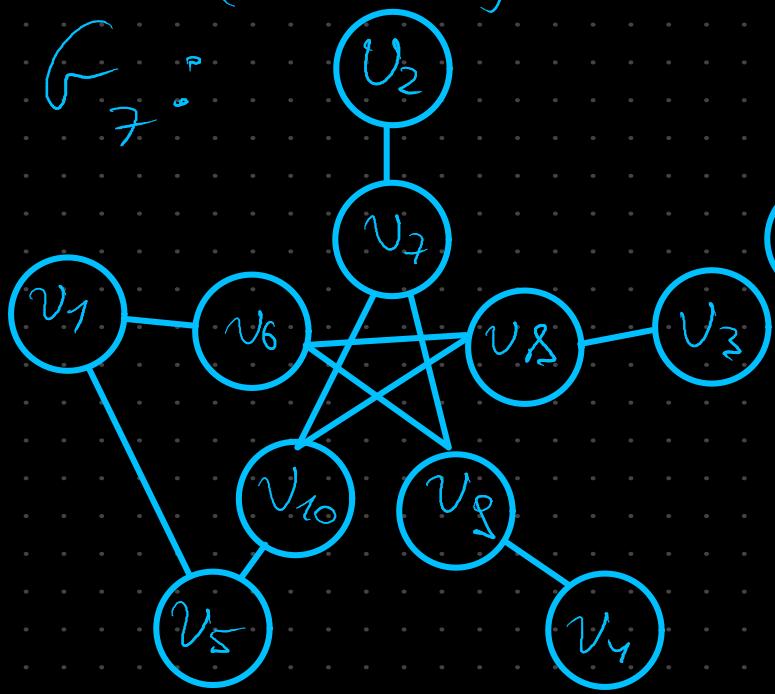


$$G_6:$$

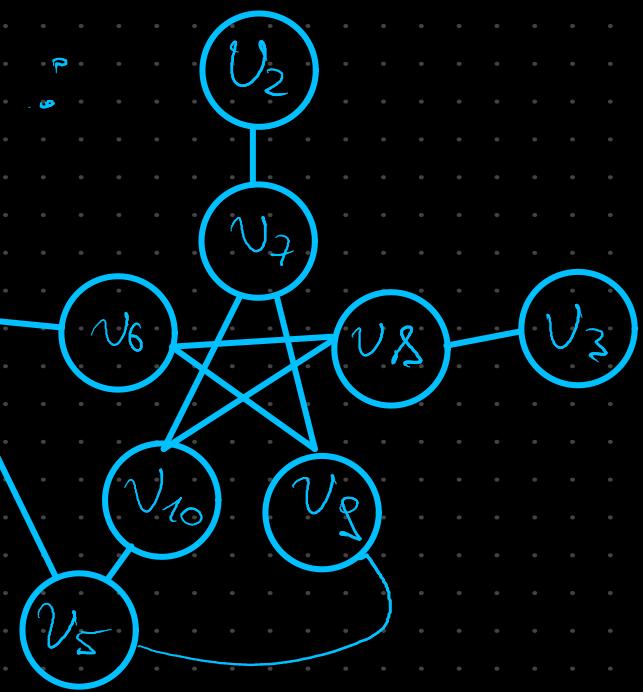


$$\ell = (v_4 \ v_5)$$

6



8

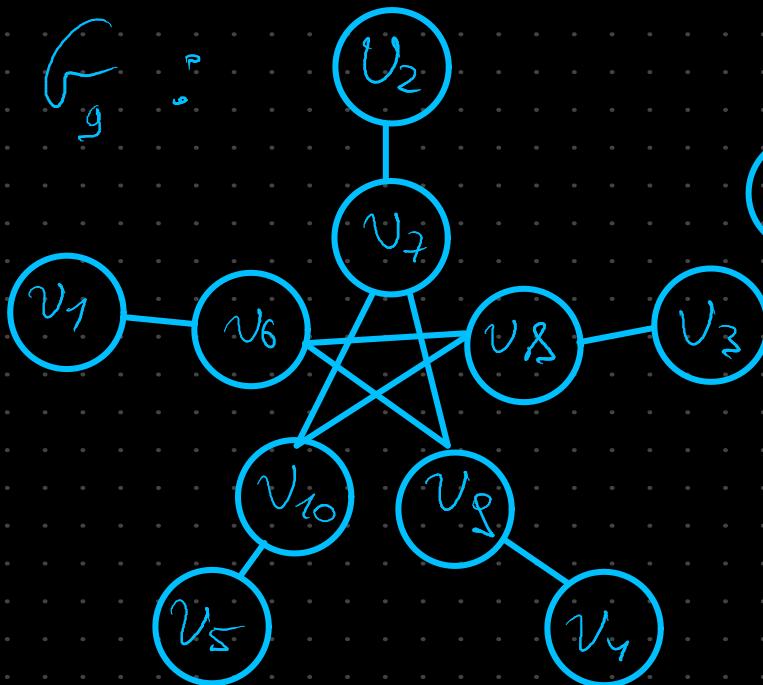


$$G_3 = G_2 \setminus \{e\},$$

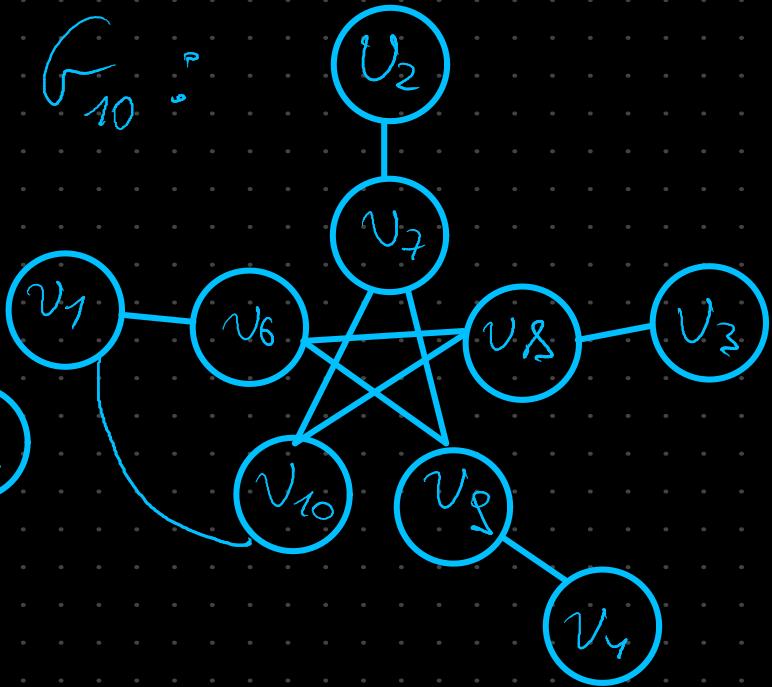
$$e = (v_0, v_1)$$

$$G_{10} = G_7 / \langle 5e \rangle$$

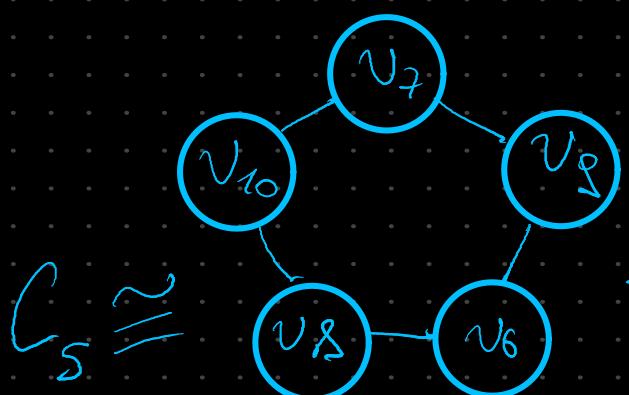
6



5

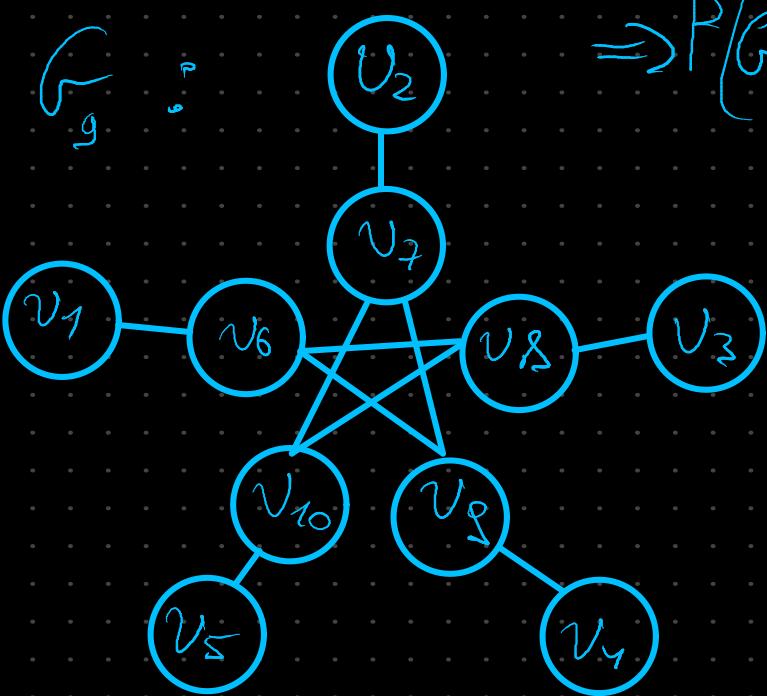


Тимо Уап С.

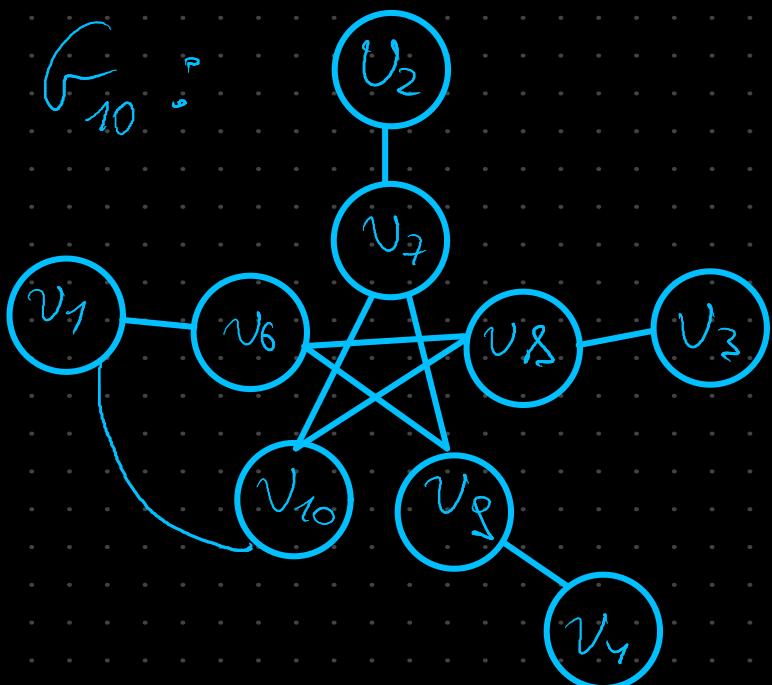


$$\Rightarrow P(\{k\}) = (k-1)^{\delta} - (k-1)$$

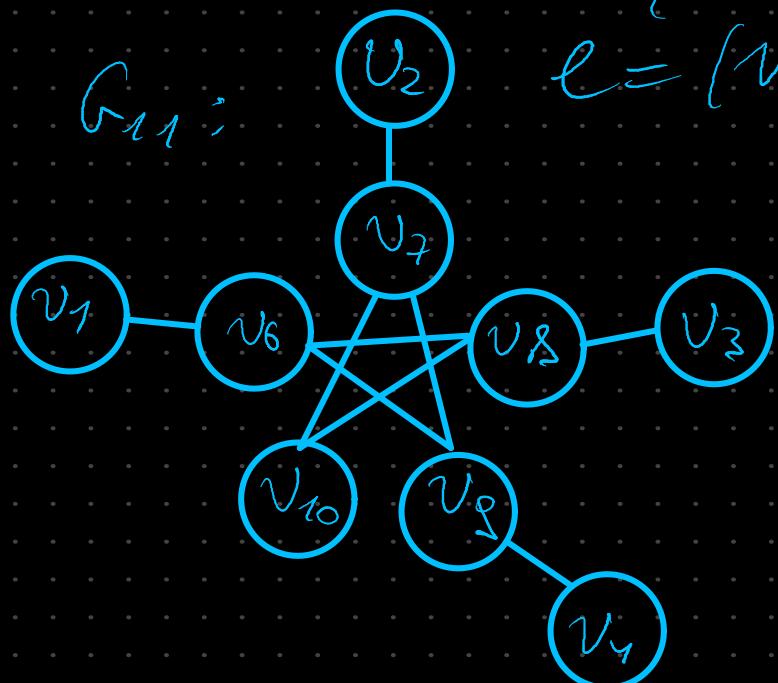
g



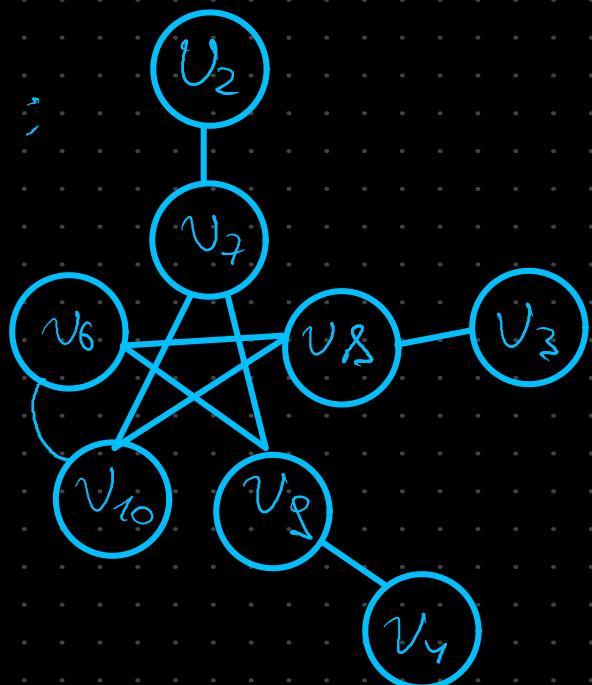
$$\Rightarrow P(G_9, k) = (k-1)^5 \cdot P(S, k)$$



Gr. 1



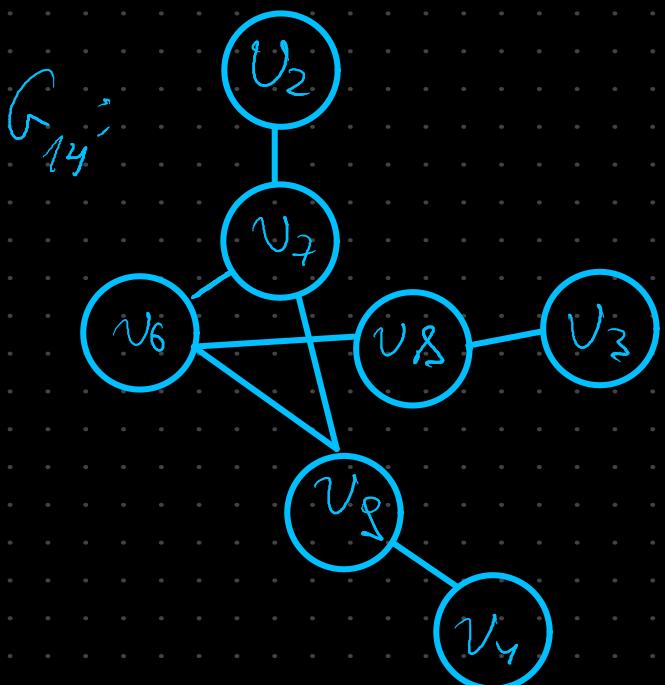
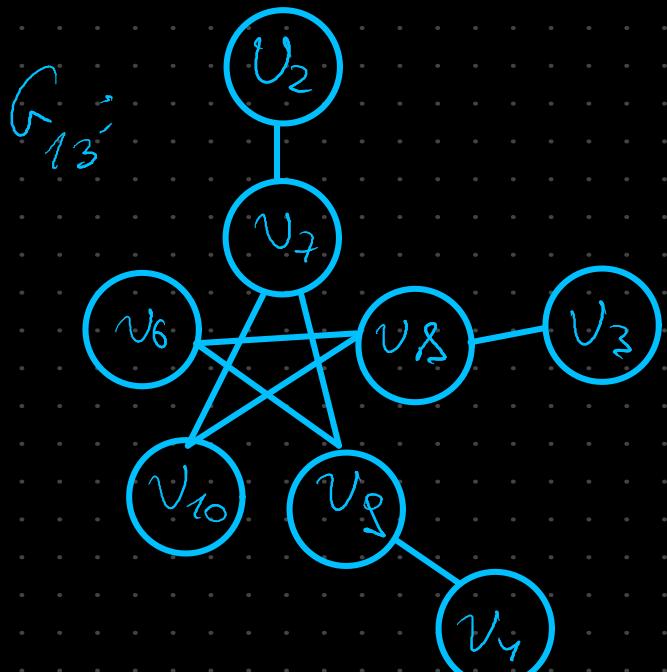
612



$$P(G_{n,k}) = (k-1)^n \cdot P(S_{n,k})$$

$$G_{13} = G_{12} \setminus \{e\}, \quad G_{14} = G_{12} / \{e\}$$

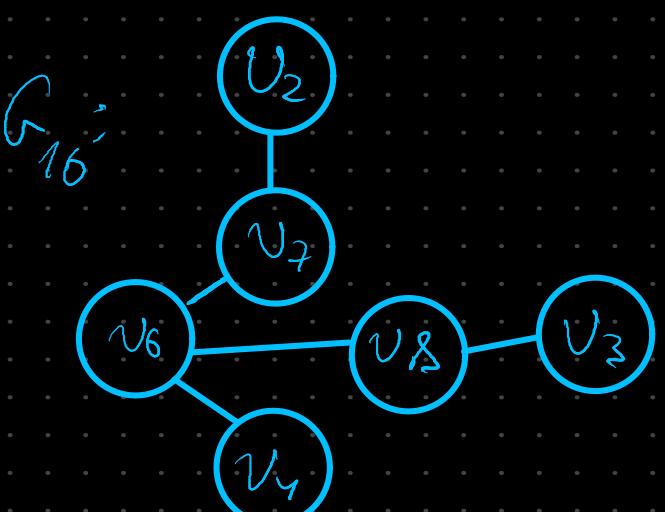
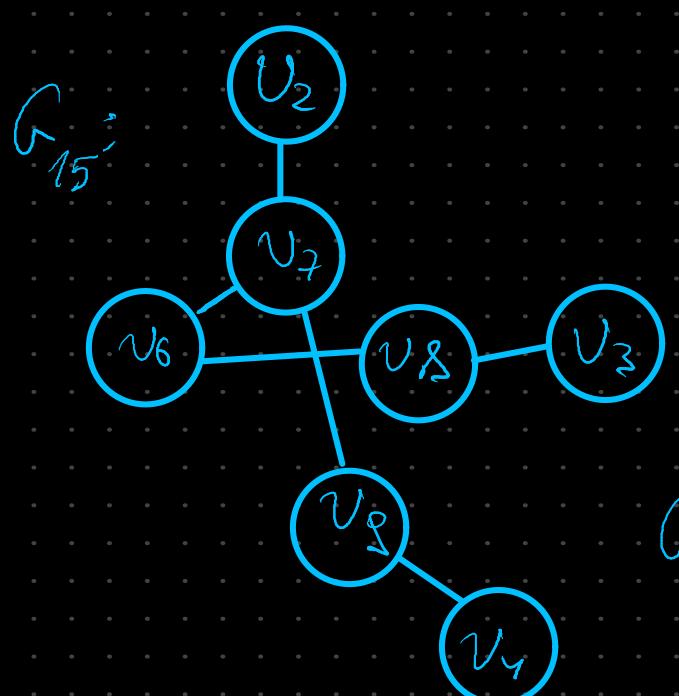
$$e = (v_6, v_{10})$$



$$P(G_{13}, k) = (k-1)^3 \cdot P(S, k)$$

$$G_{15} = G_{14} \setminus \{e\}, \quad G_{16} = G_{14} / \{e\}$$

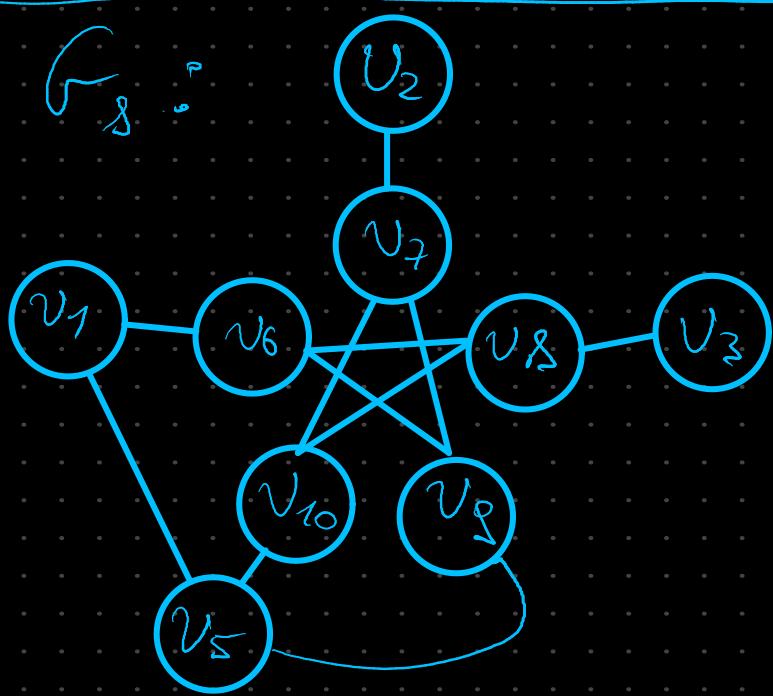
$$e = (v_6, v_9)$$



$$G_{16} \cong T_6 \Rightarrow P(G_{16}, k) = k(k-1)^5$$

$$G_{15} \cong T_7 \Rightarrow P(G_{15}, k) = k(k-1)^6$$

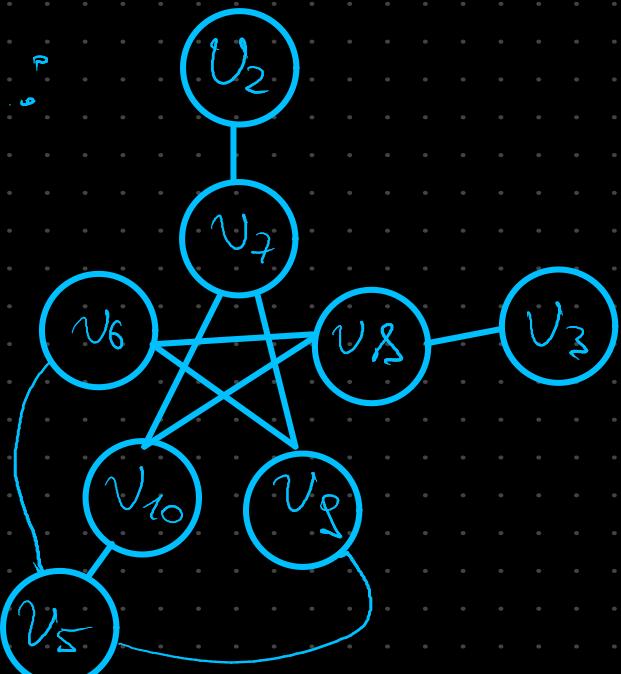
G_8 :



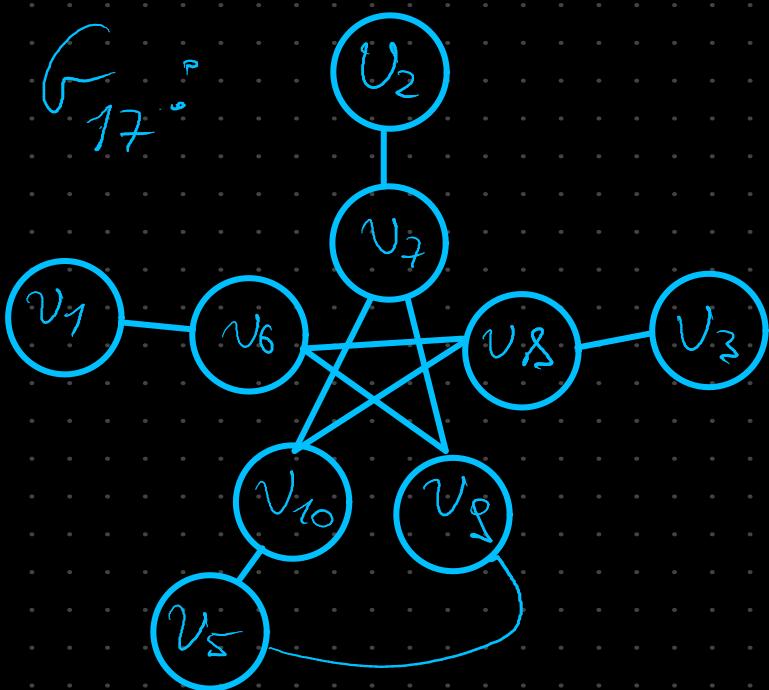
$$G_{17} = G_8 \setminus \{e\}, \quad G_{18} = G_8 / \{e\}$$

$$e = (v_1, v_5)$$

G_8 :

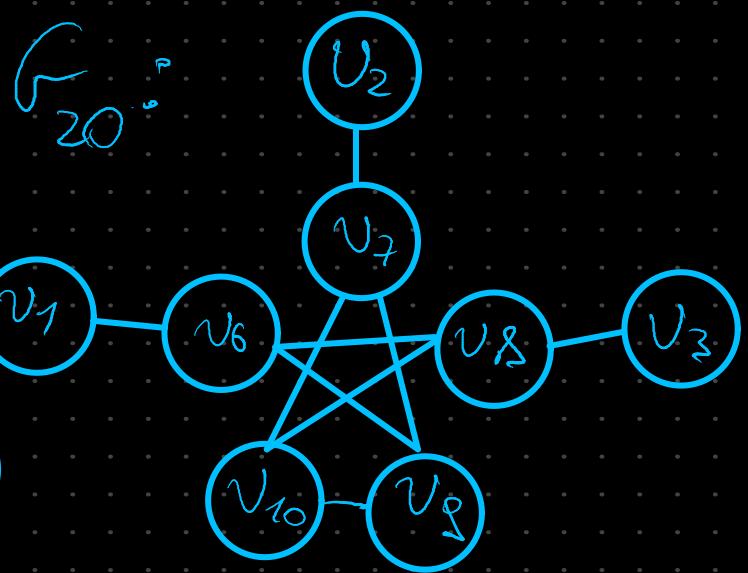
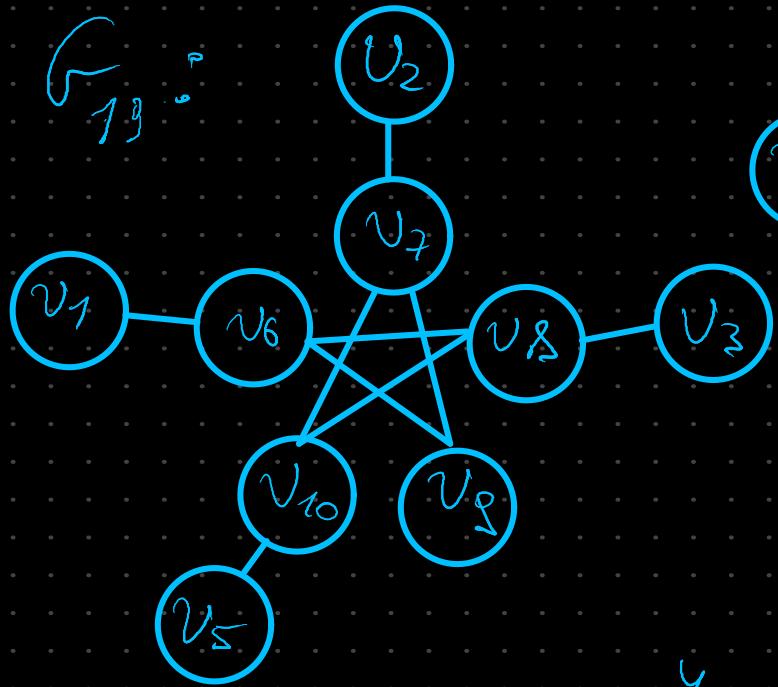


G_{17} :

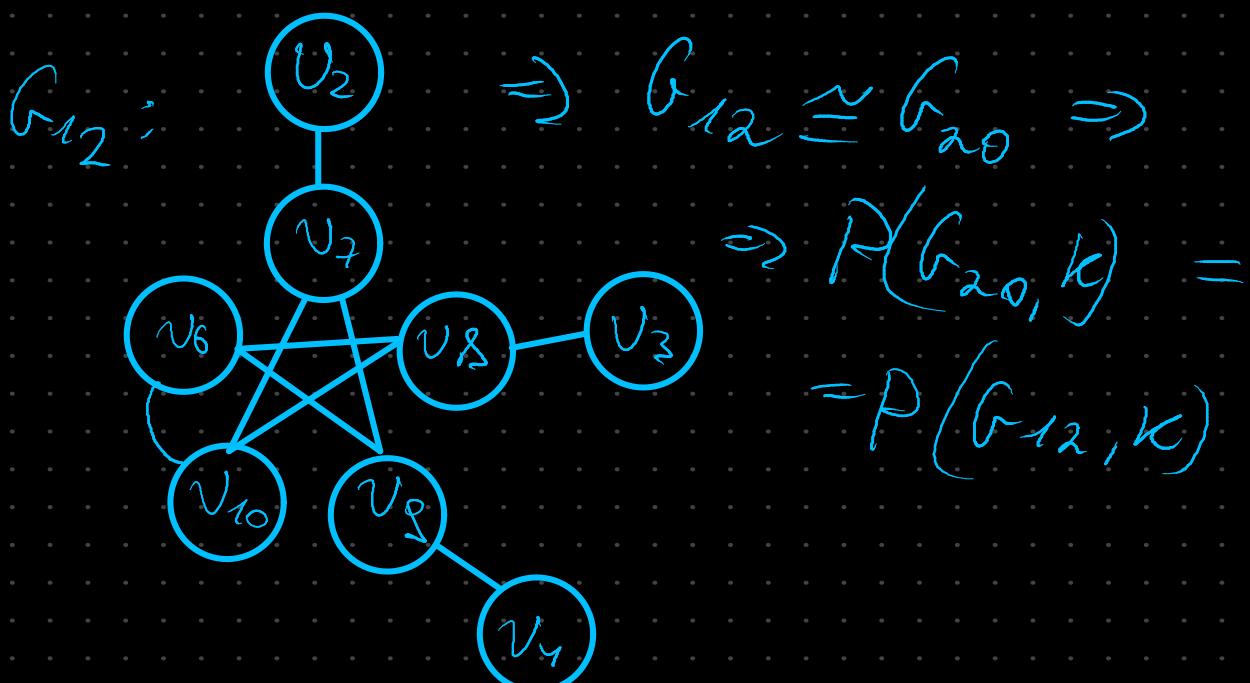


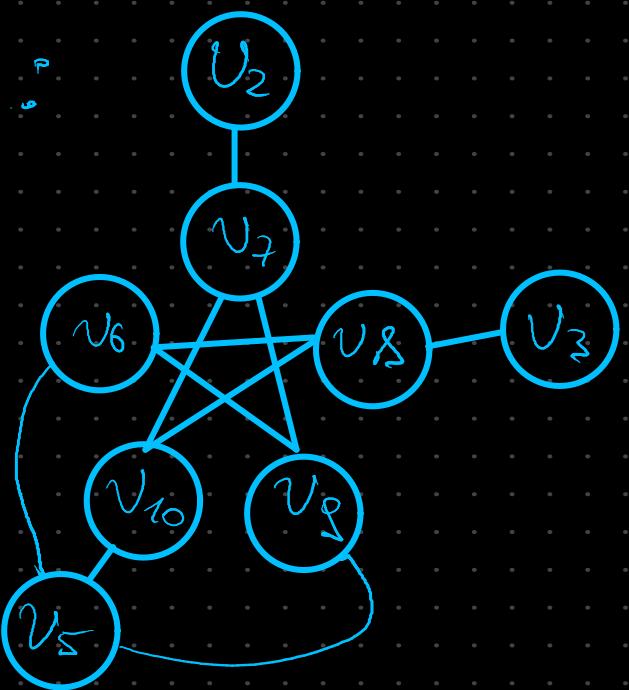
$$G_{12} = G_{17} \setminus \{\ell\}, \quad G_{20} = G_{17} / \{\ell\}$$

$$\ell = (v_5, v_8)$$



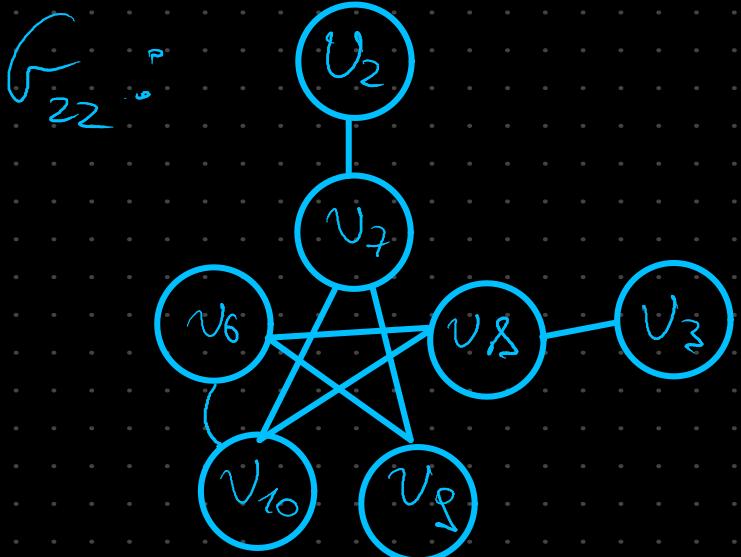
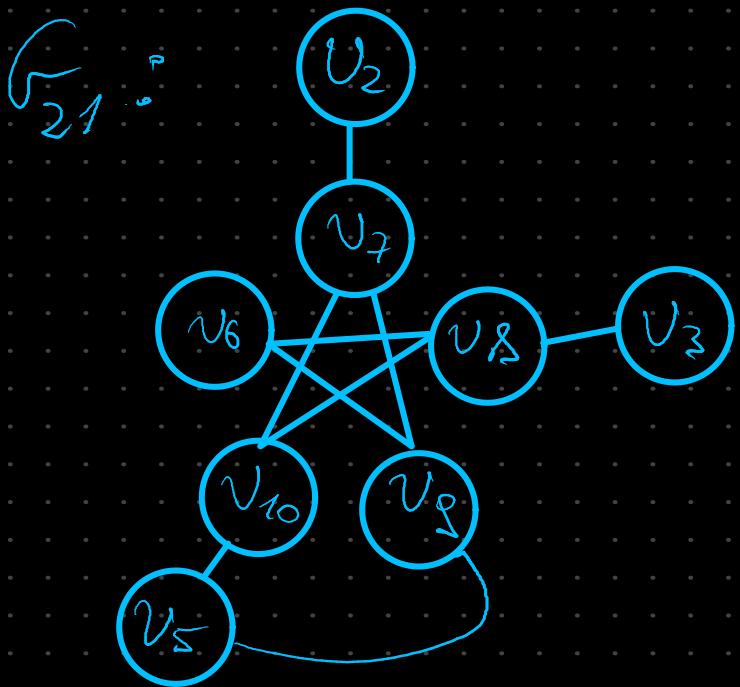
$$P(G_{ij}, k) = P(S_i, k) \cdot (k-1)^{j-i}$$





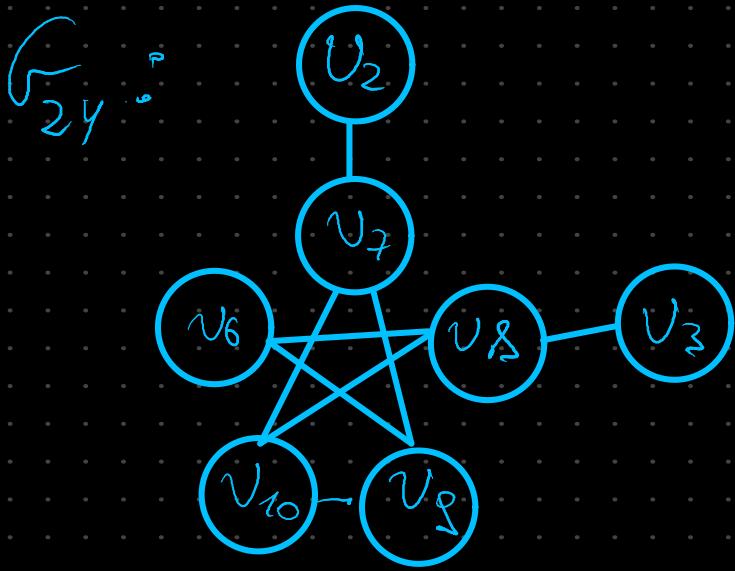
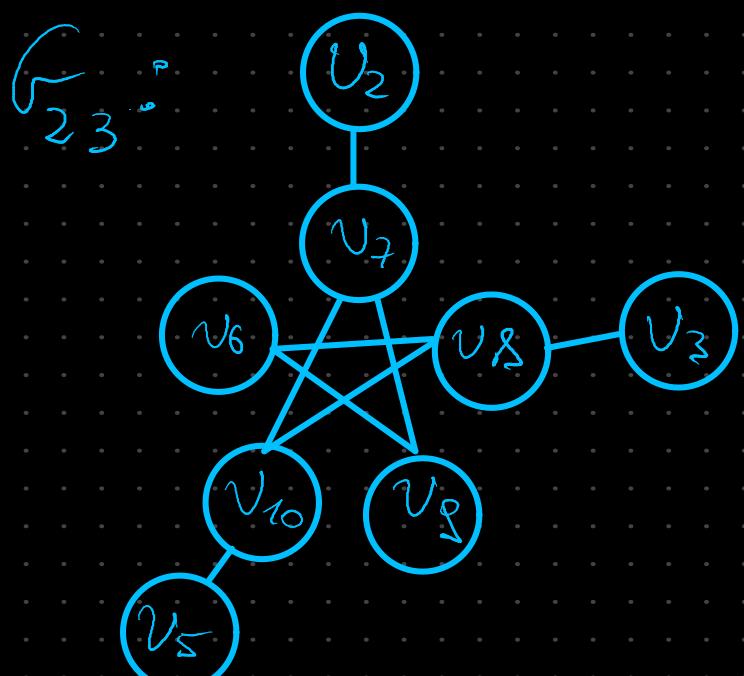
$$G_{21} = G_{18} \setminus \{e\}, \quad G_{22} = G_{18} / \{e\}$$

$$e = (v_5, v_6)$$



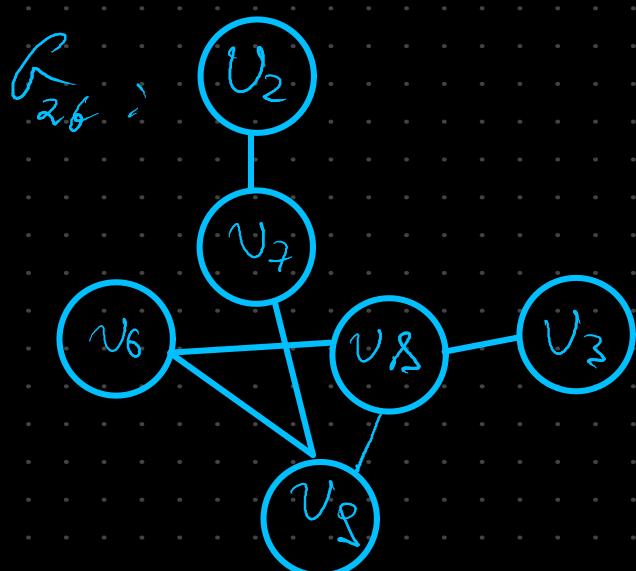
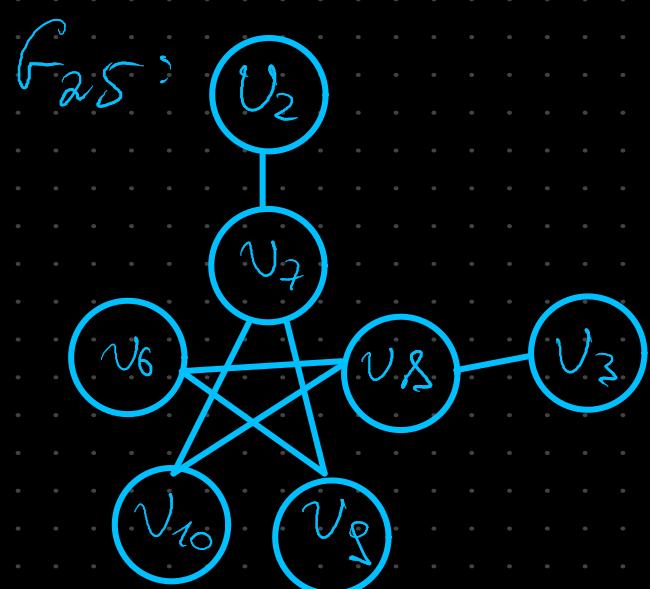
$$G_{23} = G_{24} \setminus \{e\}, \quad G_{24} = G_{21} \setminus \{e\}$$

$$e = (v_5, v_9)$$



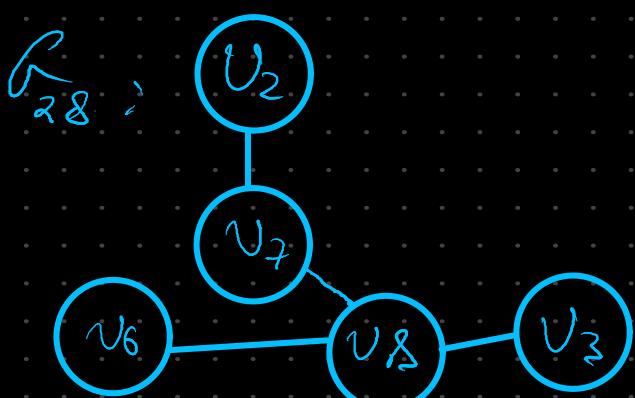
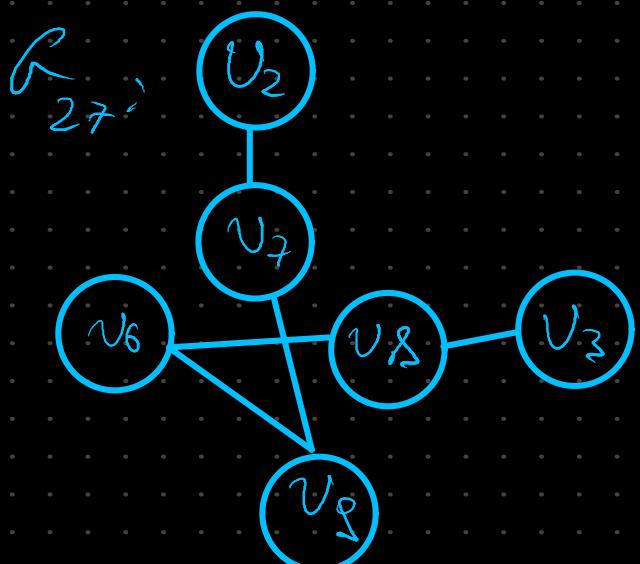
$$P(G_{23}, k) = P(S, k) \cdot (k-1)^3$$

$$G_{25} = G_{24} \setminus \{e\}, \quad G_{26} = G_{24} / \{e\}, \quad e = \{v_8, v_{10}\}$$



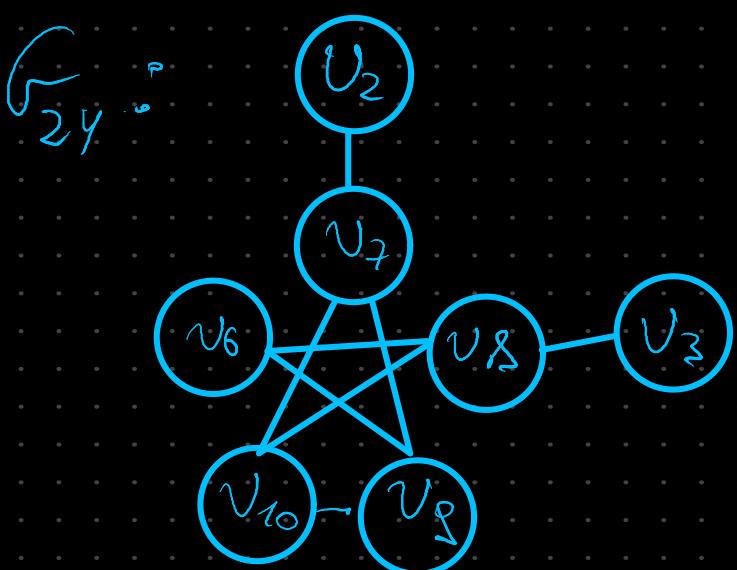
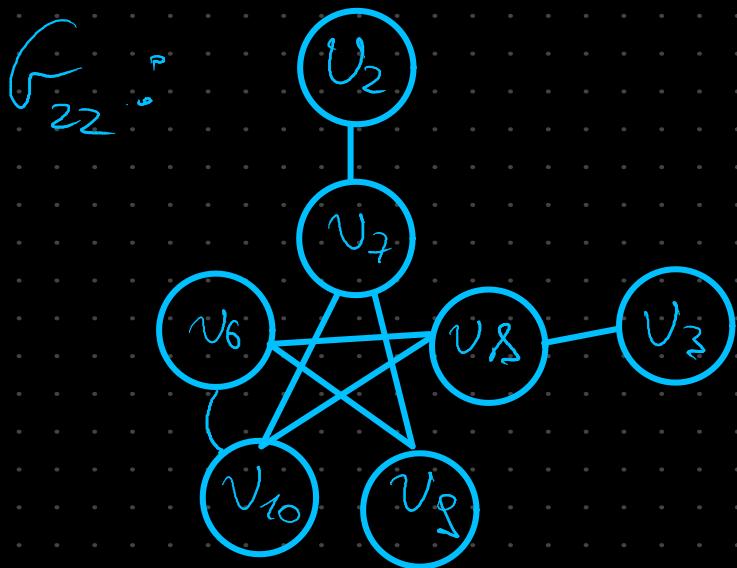
$$P(G_{25}, k) = P(S, k) \cdot (k-1)^2$$

$$G_{27} = G_{26} \setminus \{e\}, \quad G_{28} = G_{26} / \{e\}, e = (v_8, v_8)$$

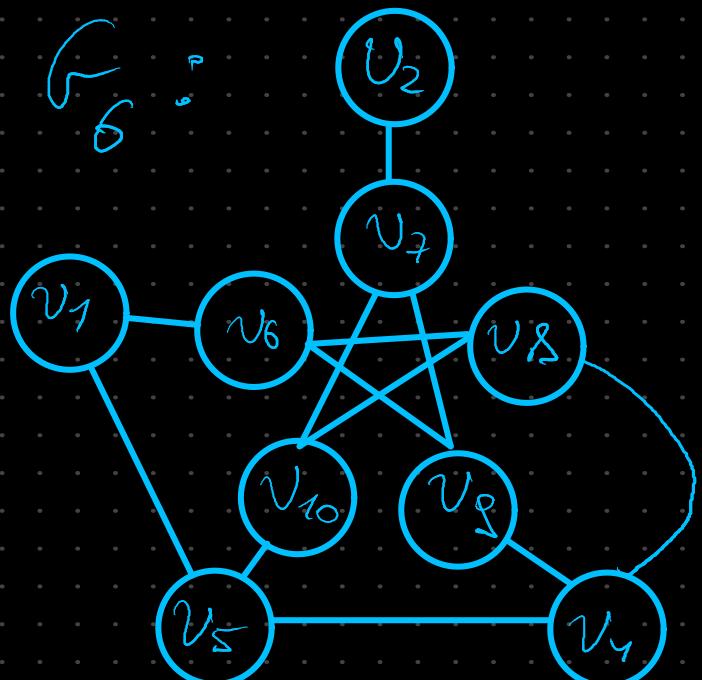


$$G_{27} \cong W_6 \Rightarrow P(G_{27}, k) = k(k-1)^5$$

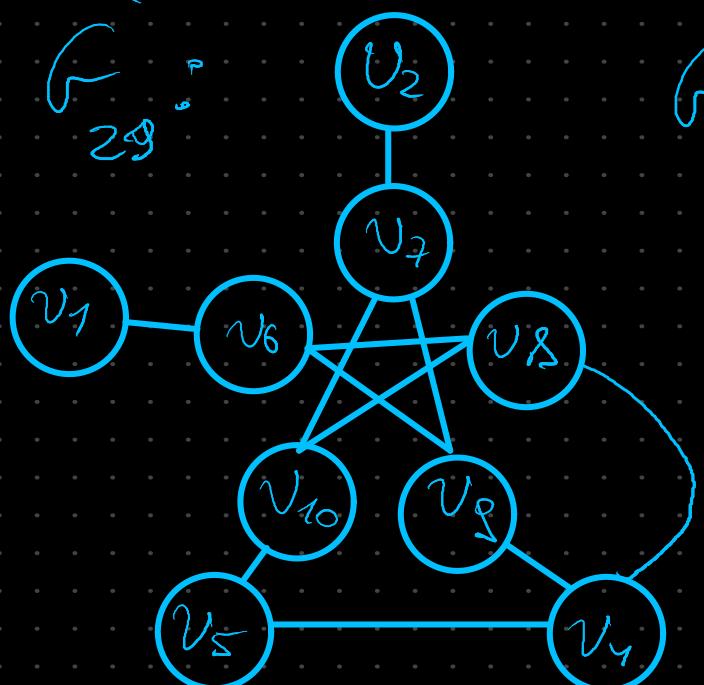
$$G_{28} \cong T_5 \Rightarrow P(G_{28}, k) = k(k-1)^4$$



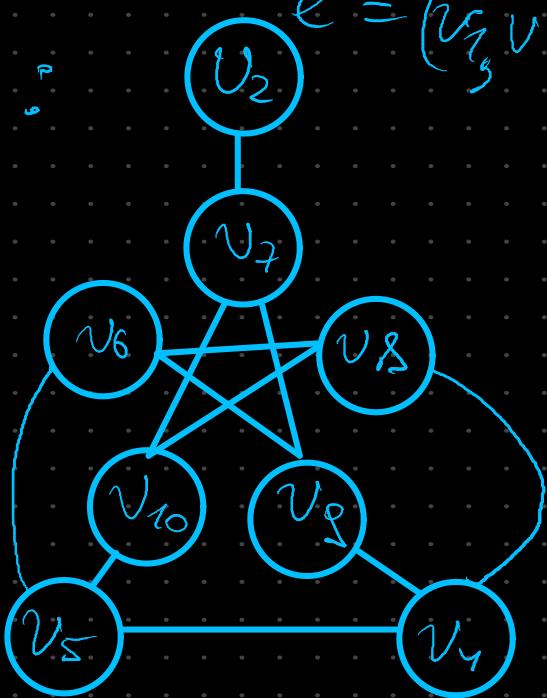
$$G_{22} \cong G_{24} \Rightarrow P(G_{22}, k) = P(G_{24}, k)$$

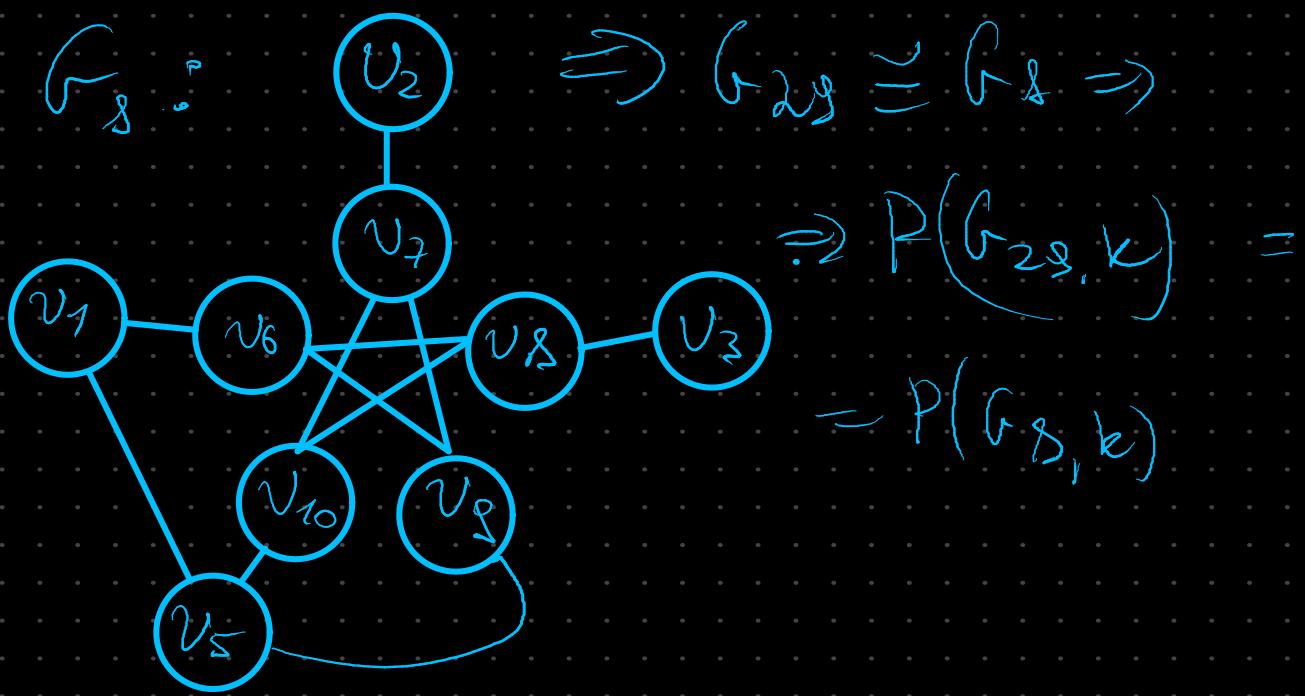


$$G_{2g} = G_6 \setminus \{e\}, \quad G_{30} = G_6 \setminus \{e\},$$



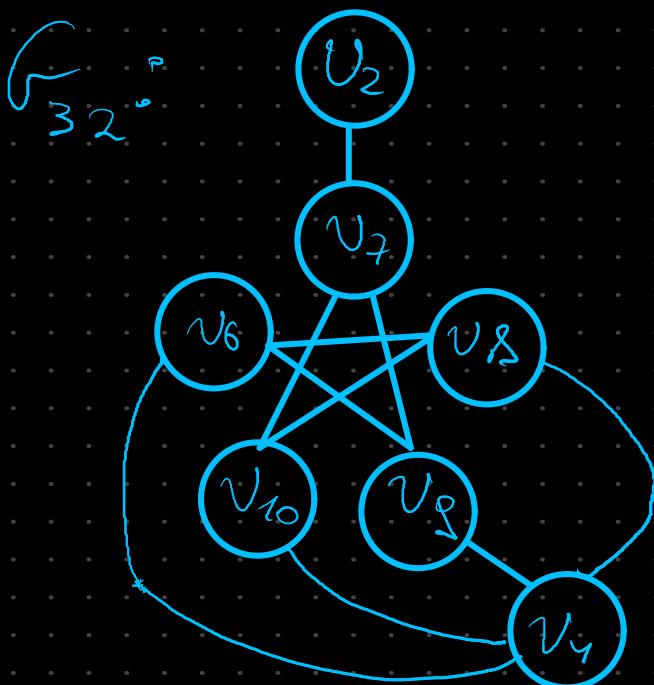
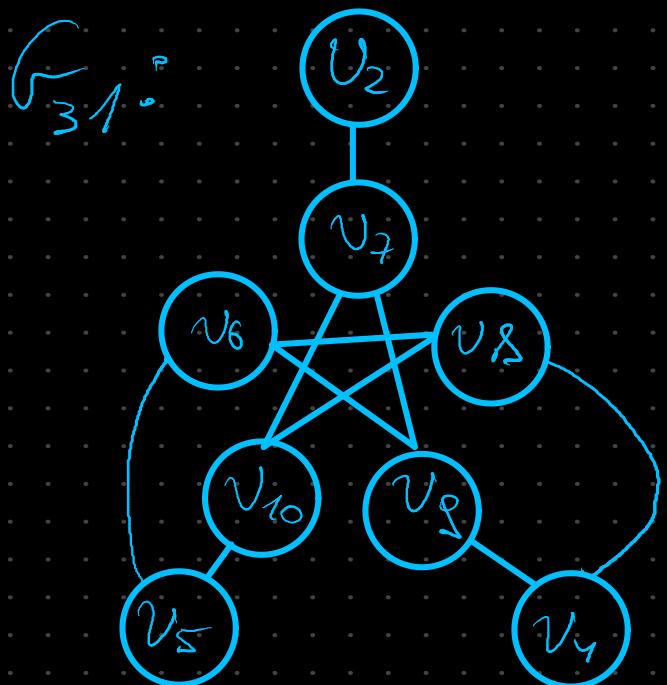
60°





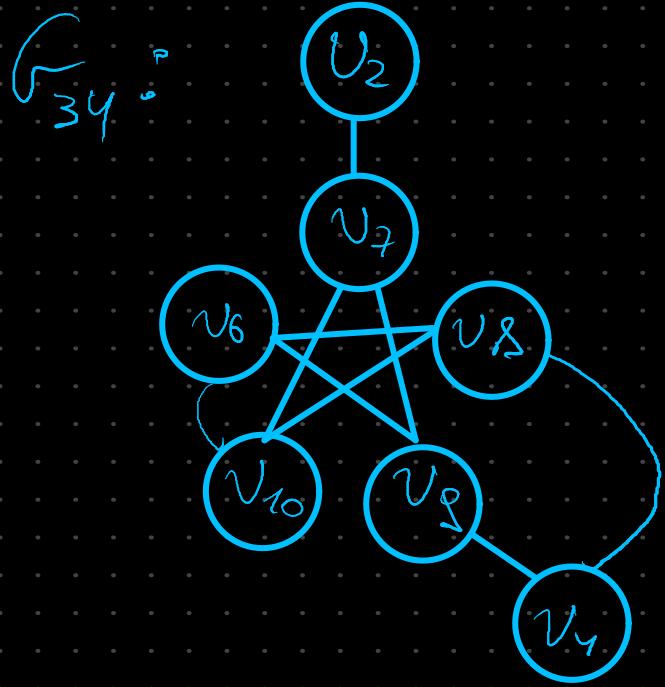
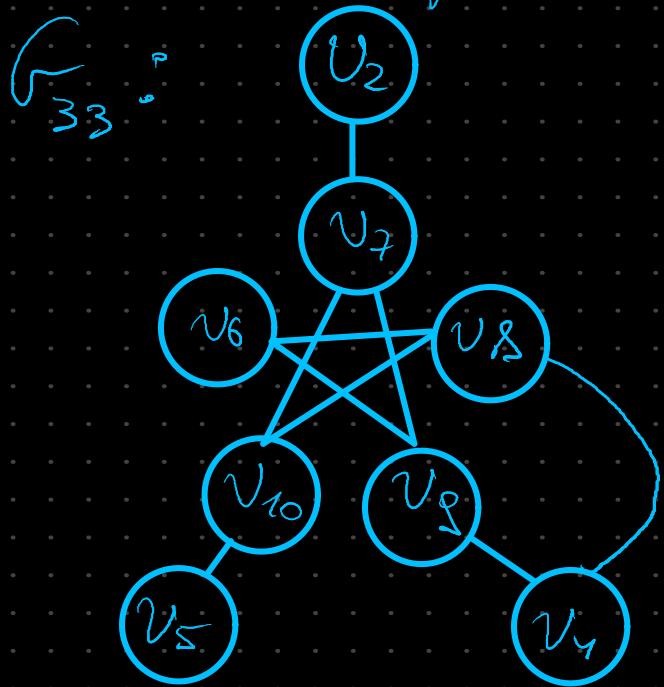
$$G_{31} = G_{30} \setminus \{e\}, G_{32} = G_{30} \cup \{e\}$$

$$e = (v_4, v_5)$$



$$G_{33} = G_{31} \setminus \{e\}, \quad G_{34} = G_{31} / \{e\},$$

$$e = (v_6, v_8)$$



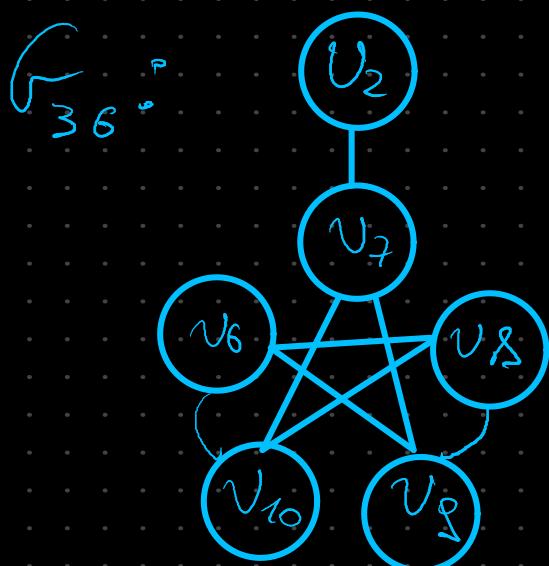
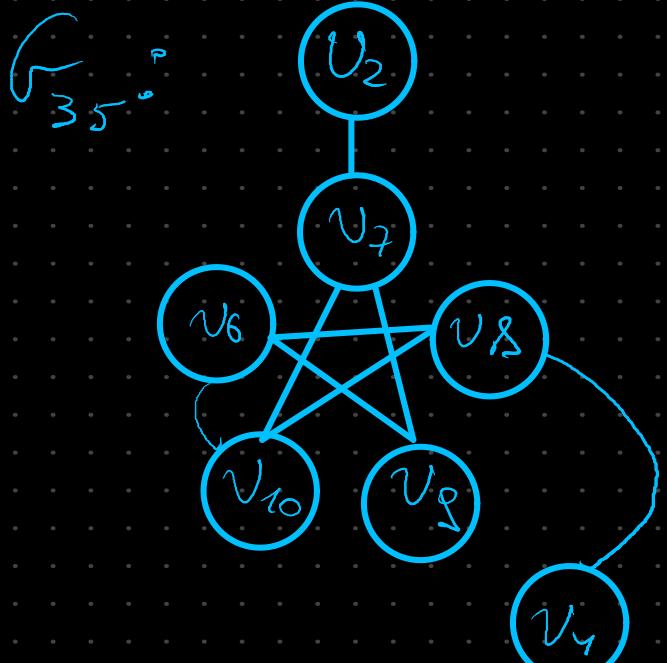
$G_{17}:$

$$\text{m.e. } G_{17} \setminus \{(v_2, v_8)\} \cong G_{33}$$

$$\Rightarrow P(G_{17}, k) = (k-1) P(G_{33}, k) \Rightarrow$$

$$P(G_{33}, k) = \underbrace{P(G_{17}, k)}_{k-1}$$

$$G_{35} = G_{34} \setminus \{e\}, G_{36} = G_{34} / \{e\}, e = (v_4, v_9)$$

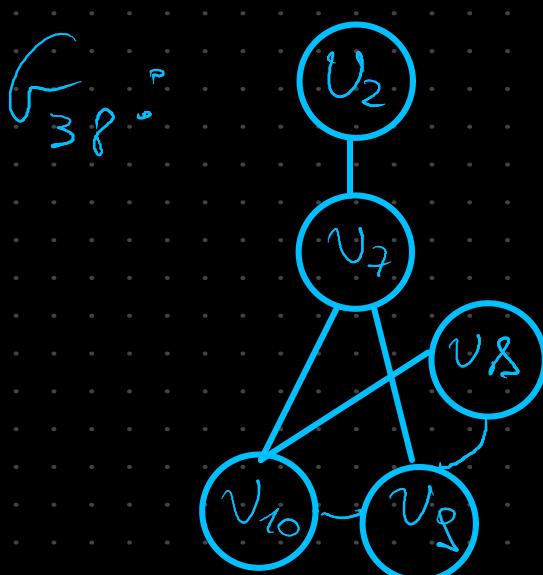
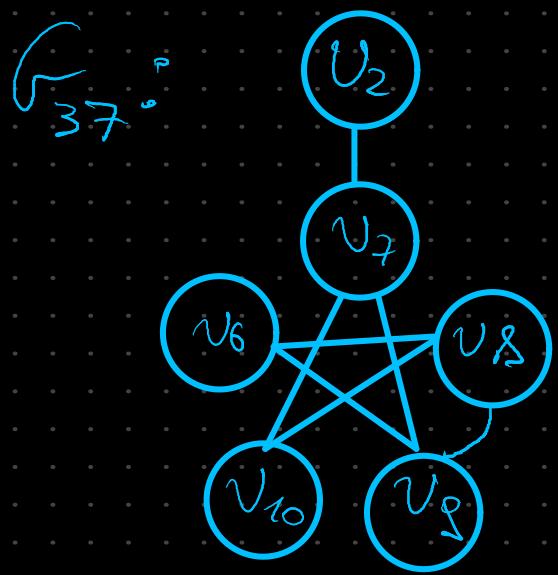


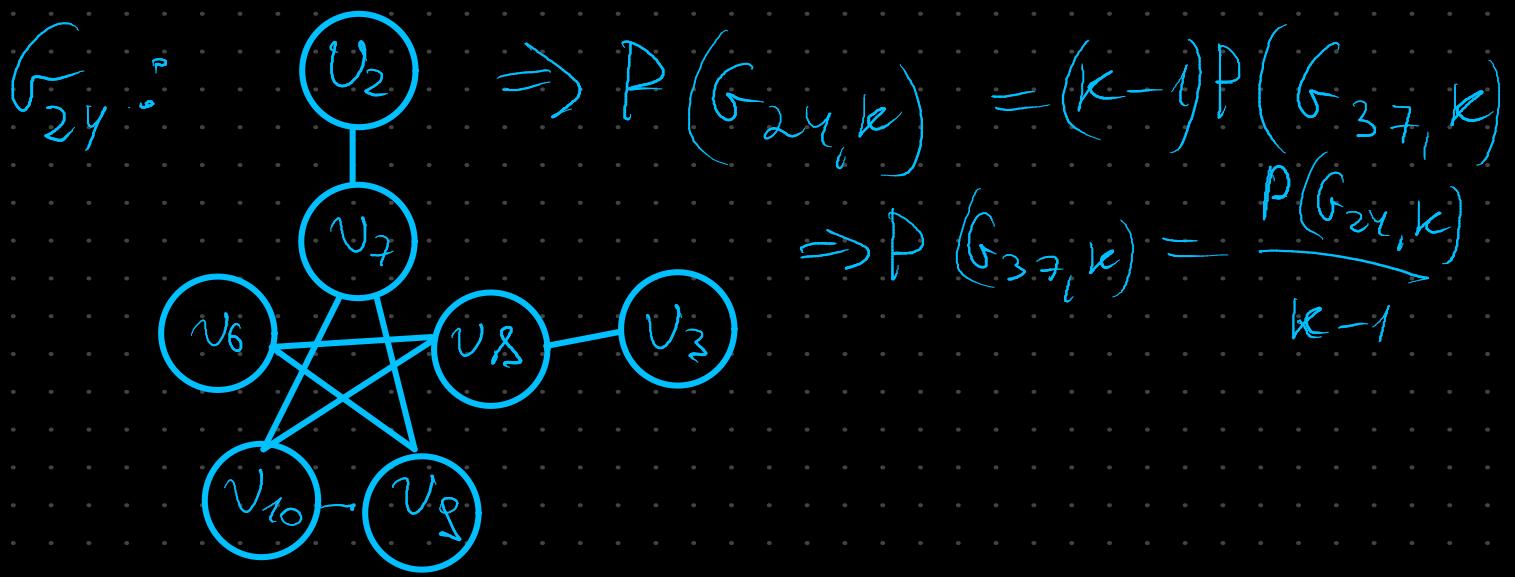
G_{22} : $\Rightarrow G_{35} \cong G_{22} \Rightarrow P(G_{34}, k) = P(G_{22}, k)$

```

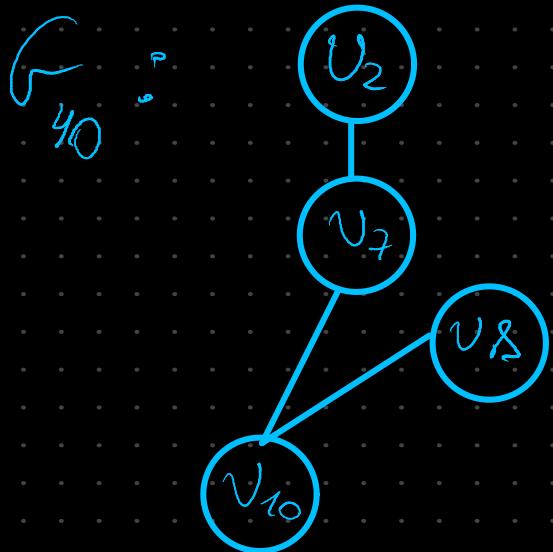
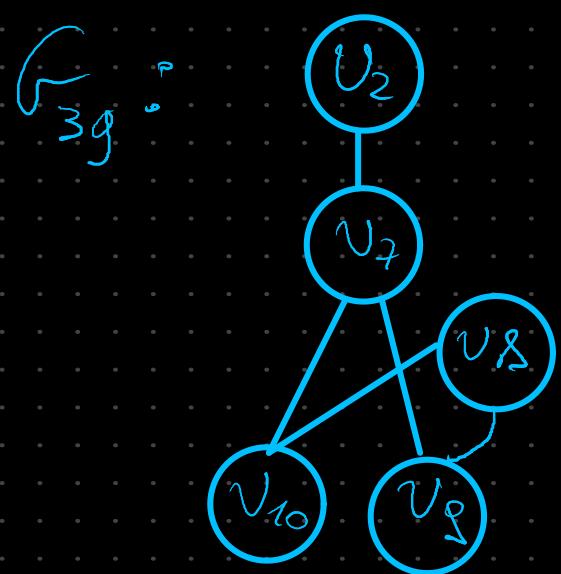
graph TD
    v2((v2)) --- v7((v7))
    v7 --- v6((v6))
    v7 --- v8((v8))
    v7 --- v9((v9))
    v7 --- v10((v10))
    v3((v3)) --- v8
  
```

$$G_{37} = G_{36} \setminus \{e\}, G_{38} = G_{36} / \{e\}, e = (v_6, v_{10})$$





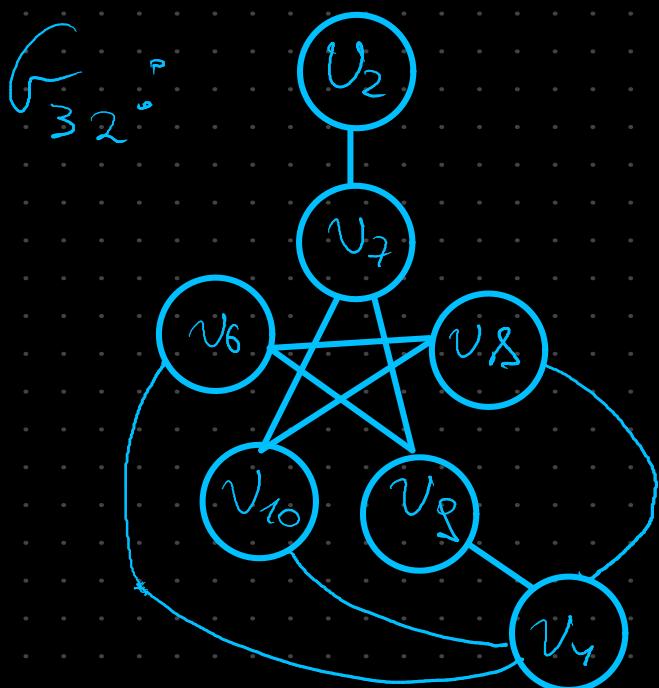
$$G_{38} = G_{38} \setminus \{e\}, G_{40} = G_{38} / \{e\}, e = (v_8, v_{10})$$



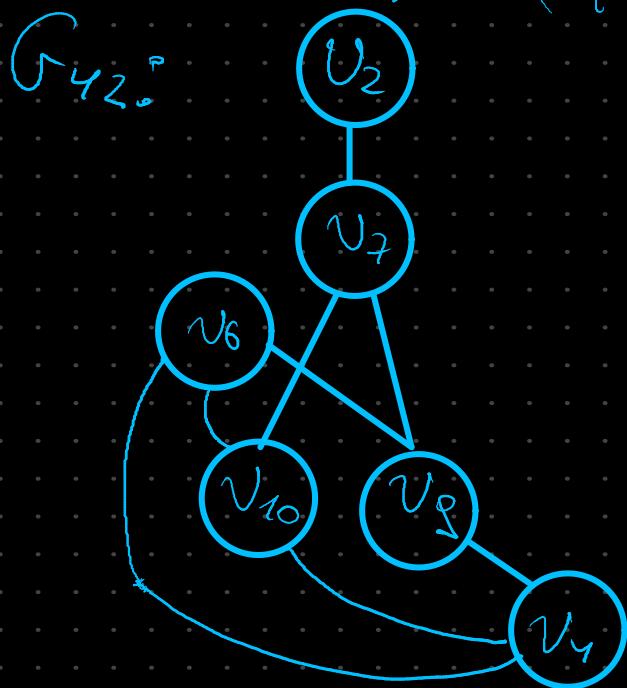
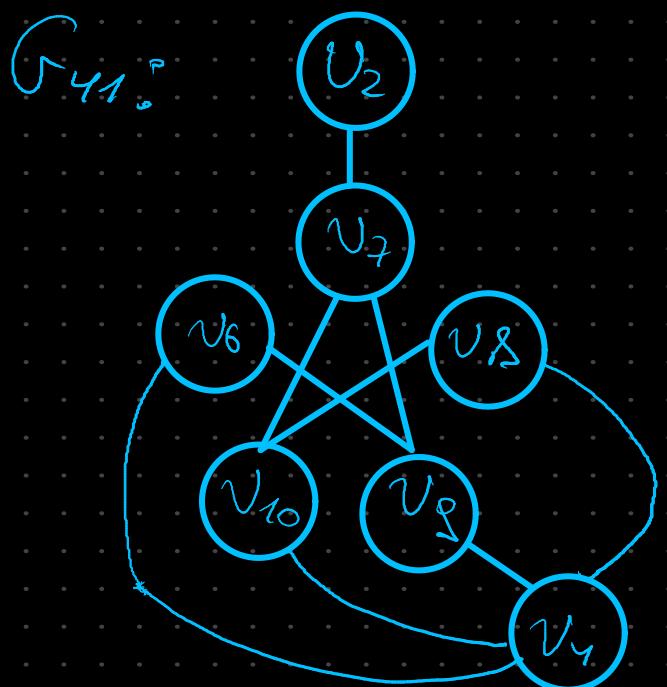
$$G_{38} \cong C_4 \cup \{(v_2, v_7)\} \quad G_{40} \cong W_4 \Rightarrow P(G_{40}, k) = k(k-1)^3$$

$$\Rightarrow P(G_{38}, k) = (k-1) \left((k-1)^4 + (k-1) \right) =$$

$$= (k-1)^3 ((k-1)^3 + 1)$$

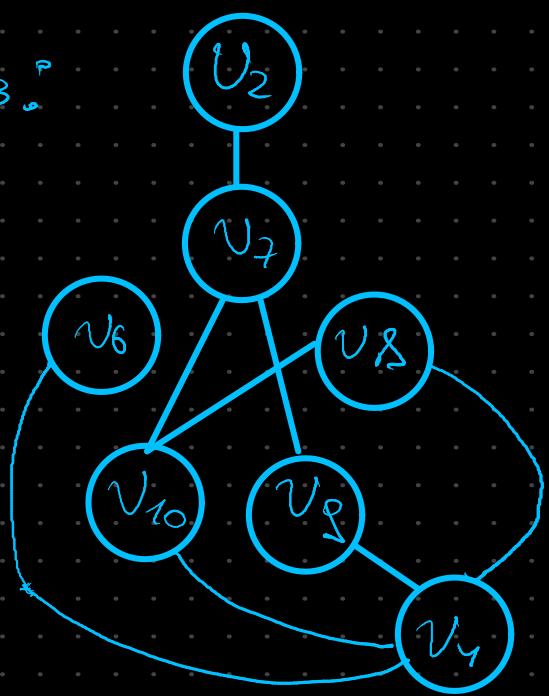


$$G_{41} = G_{32} \setminus \{e\}, G_{42} = G_{32} / \{e\}, e = (v_6, v_8)$$

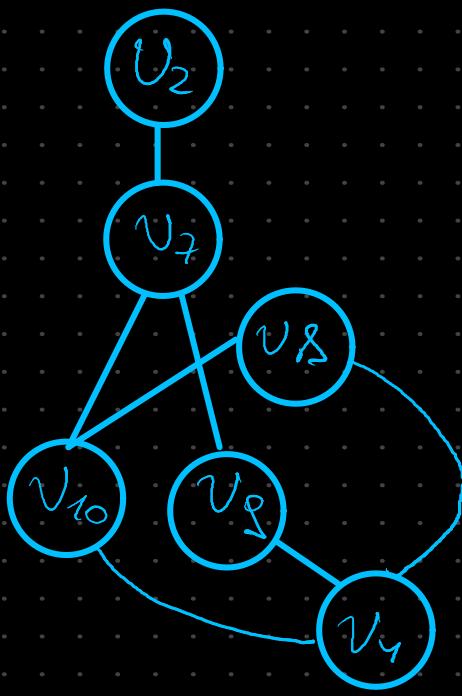


$$G_{43} = G_{41} \setminus \{e\}, G_{44} = G_{41} / \{e\}, e = (v_6, v_8)$$

G_{43} :

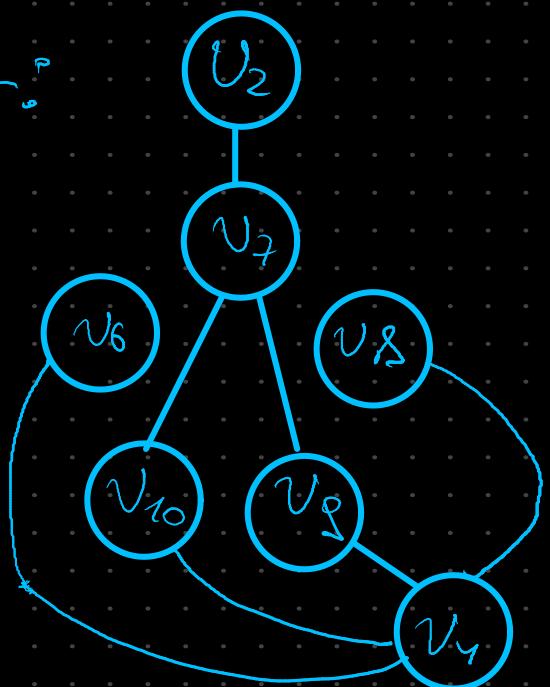


G_{44} :

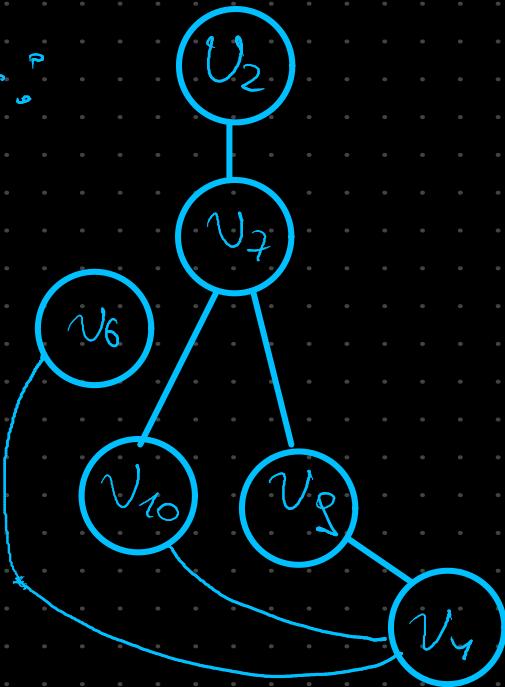


$$G_{45} = G_{43} \setminus \{e\}, G_{46} = G_{43} / \{e\}, e = (v_8, v_{10})$$

G_{45} :

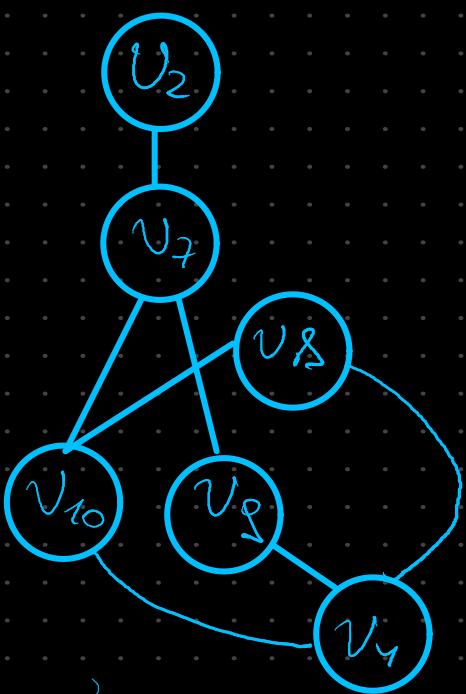


G_{46} :

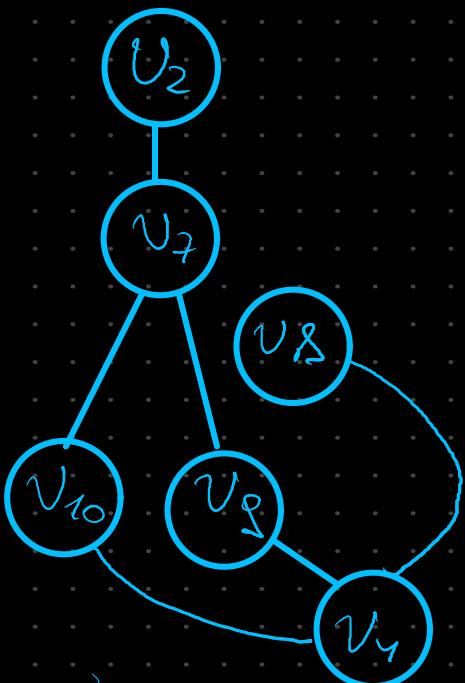
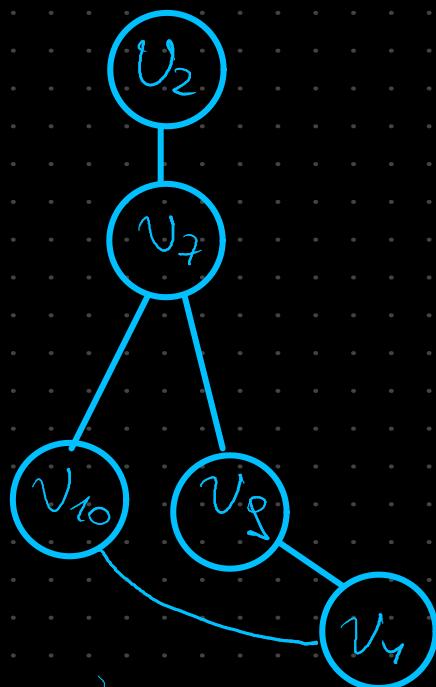


$$P(G_{45}, k) = P(G_4, k) \cdot (k-1)^3 = (k-1)^4 ((k-1)^3 + 1)$$

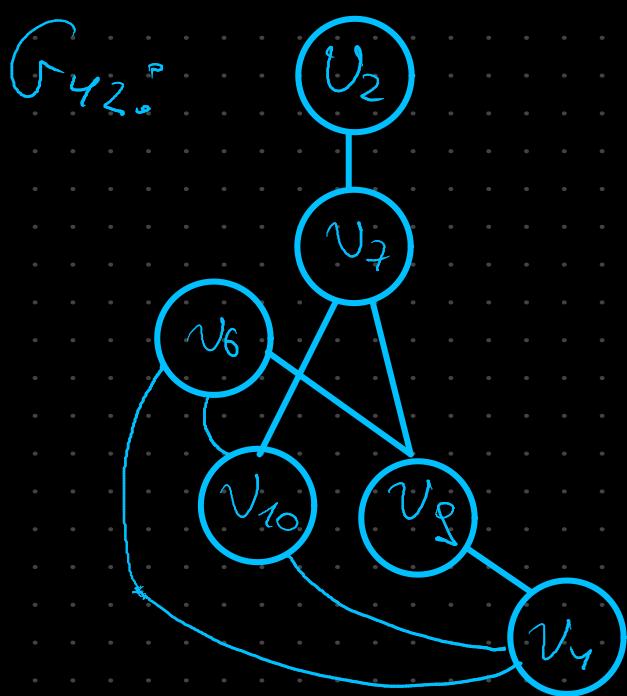
$$P(G_{46}, k) = P(G_4, k) \cdot (k-1)^2 = (k-1)^3 ((k-1)^3 + 1)$$

G_{44^*} 

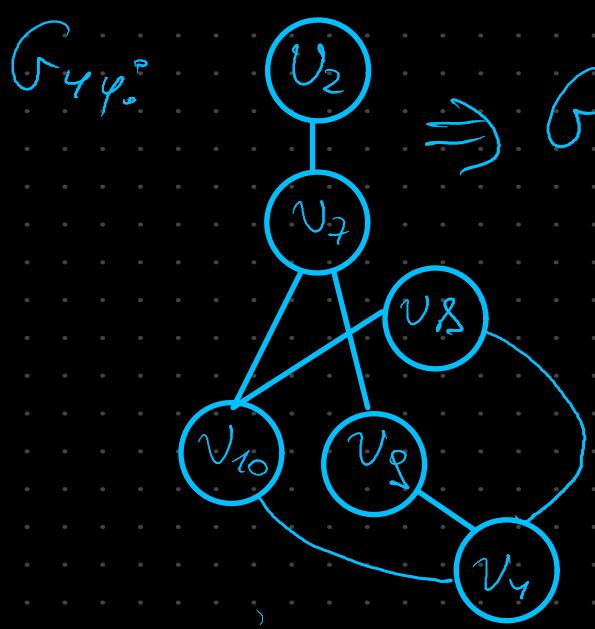
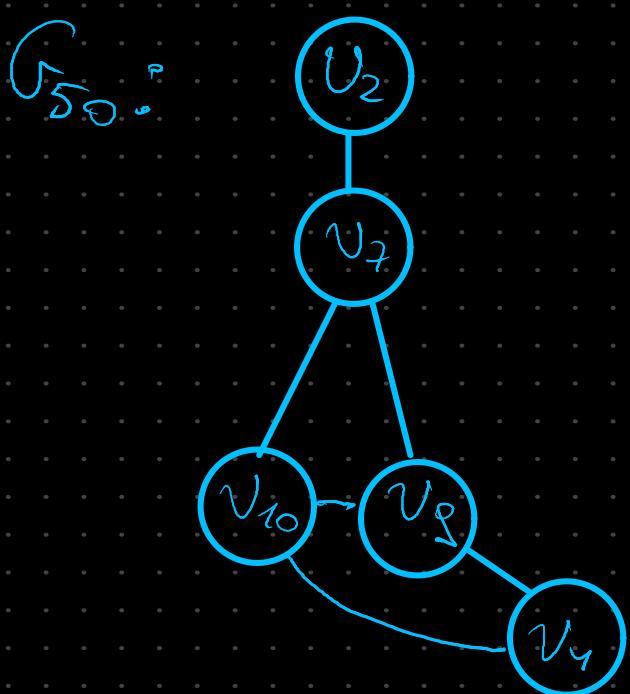
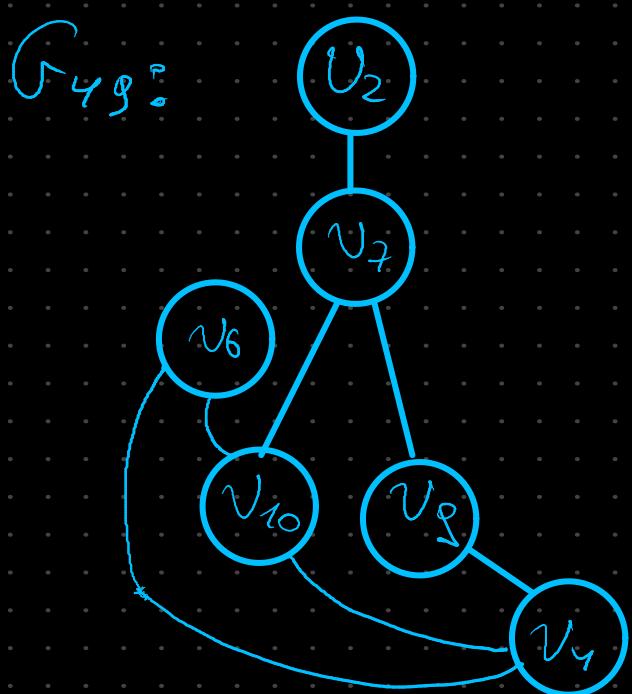
$$G_{47} = G_{44} \setminus \{e\}, \quad G_{48} = G \setminus \{e\}, e = (v_8, v_{10})$$

 G_{47^*}  G_{48^*} 

$$\begin{aligned} P(G_{47}, k) &= P(C_n, k) \cdot (k-1)^2 \\ &= (k-1)^3 ((k-1)^3 + 1) \end{aligned} \quad \left| \quad \begin{aligned} P(G_{48}, k) &= P(C_n, k) - \\ &\quad \times (k-1) = (k-1)^2 ((k-1)^3 + 1) \end{aligned} \right.$$



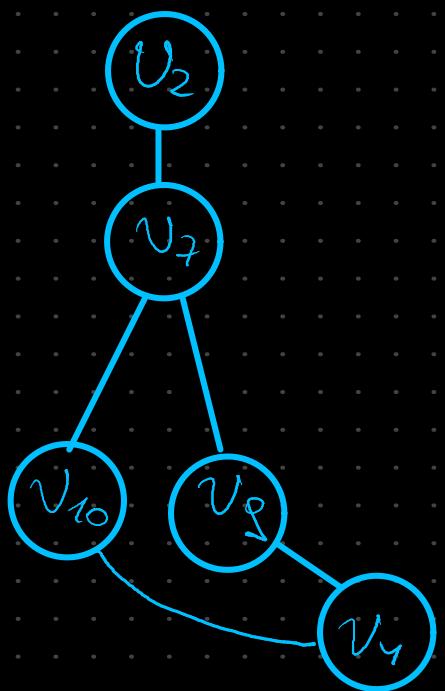
$$G_{43} = G_{42} \setminus \{e\}, \quad G_{44} = G_{42} / \{e\}, \quad e = (v_6, v_8)$$



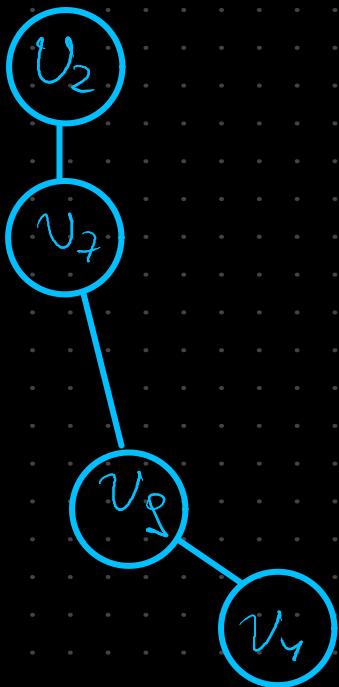
$$\Rightarrow G_{43} \cong G_{44} \Rightarrow P(G_{43}, k) = P(G_{44}, k)$$

$$G_{S1} = G_{S0} \setminus \{e\}, G_{S2} = G_{S0} / \{e\}, e = (v_1, v_{10})$$

$$G_{S1}:$$

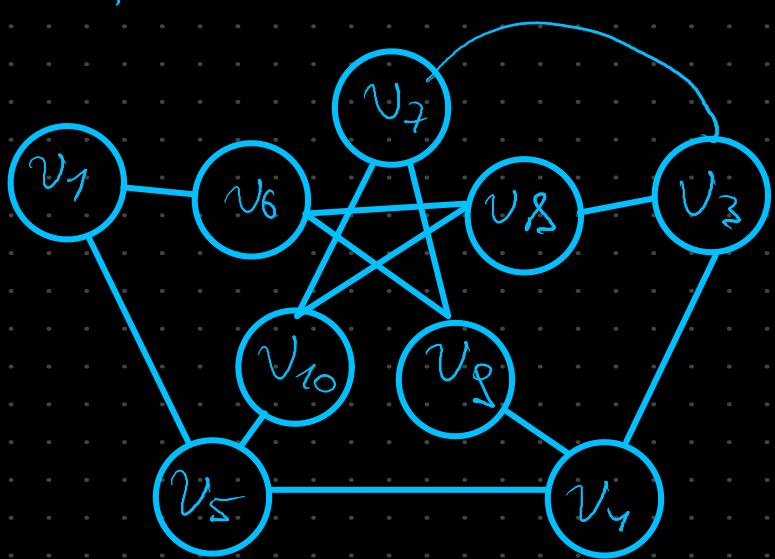


$$G_{S2}:$$



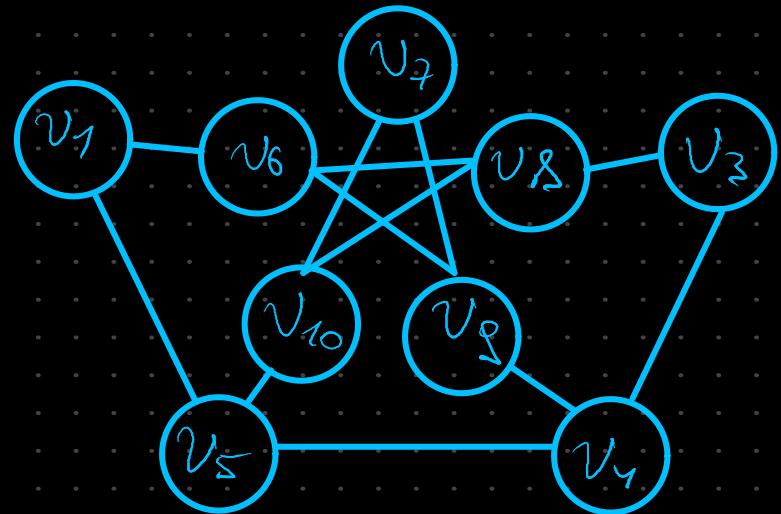
$$\begin{aligned} P(G_{S1}, k) &= P(C_4, k)(k-1) = \\ &= (k-1)^2((k-1)^3 + 1) \end{aligned} \quad \left| \quad \begin{aligned} P(G_{S2}, k) &= P(W_4) = \\ &= k(k-1)^3 \end{aligned} \right.$$

$$G_4:$$

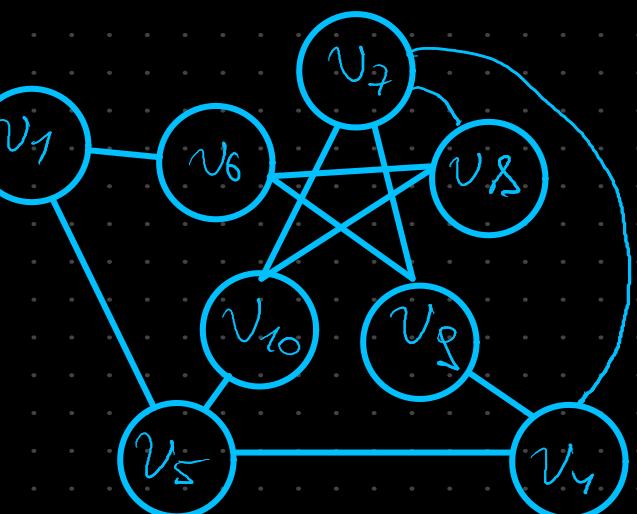


$$G_{53} = G_5 \setminus \{e\}, \quad G_{54} = G_{53} / \{e\}, \quad e = (v_3, v_2)$$

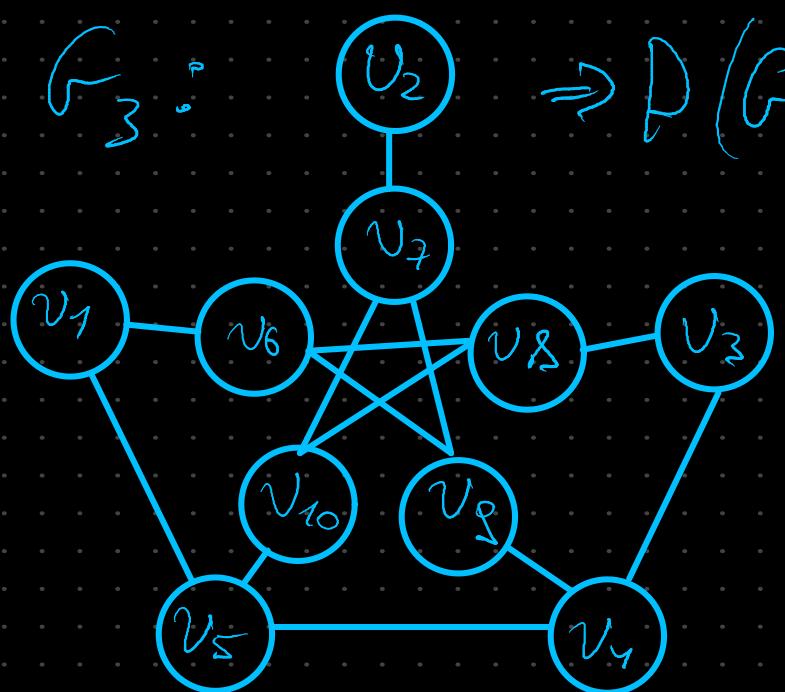
G_{53} :



G_{54} :



G_3 :

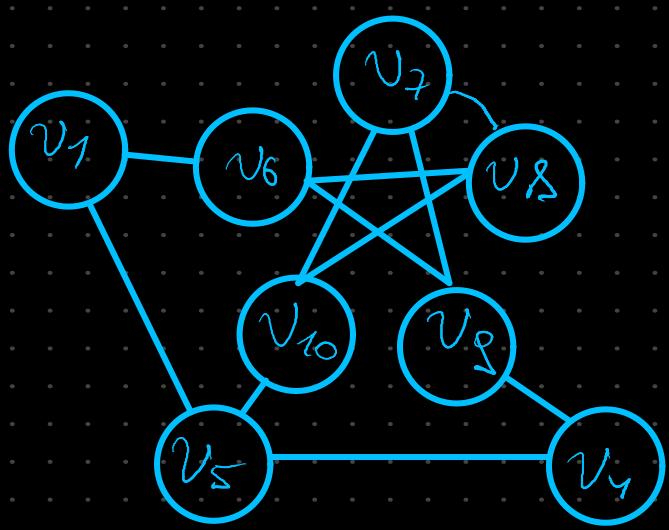


$$\Rightarrow P(G_3, k) = (k-1) \cdot P(G_{53}, k) \Rightarrow$$

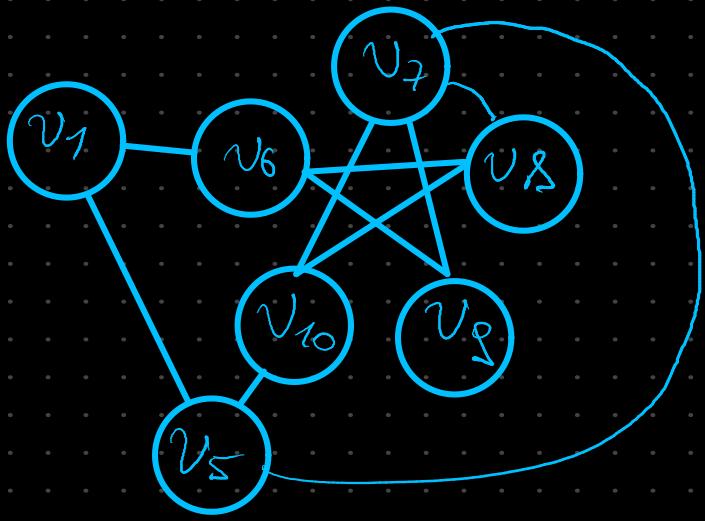
$$\Rightarrow P(G_{53}, k) = \frac{P(G_3, k)}{k-1}$$

$$G_{55} = G_{\delta 5} \setminus \{e\}, G_{\delta 6} = G_{\delta 5} / \{e\}, e = (v_7, v_8)$$

$$G_{55}:$$

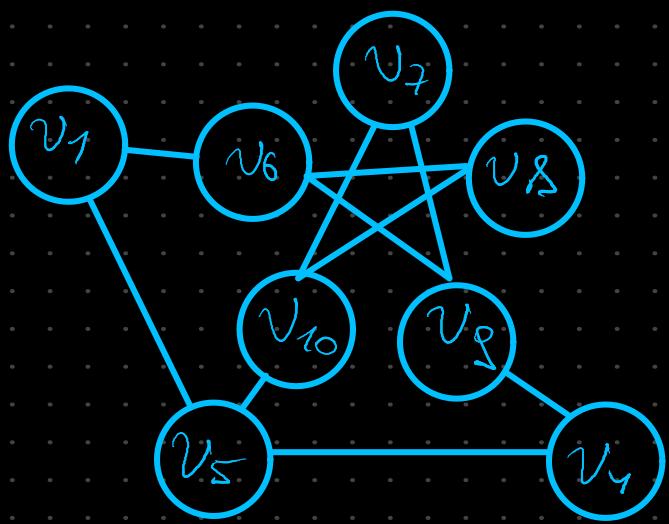


$$G_{56}:$$

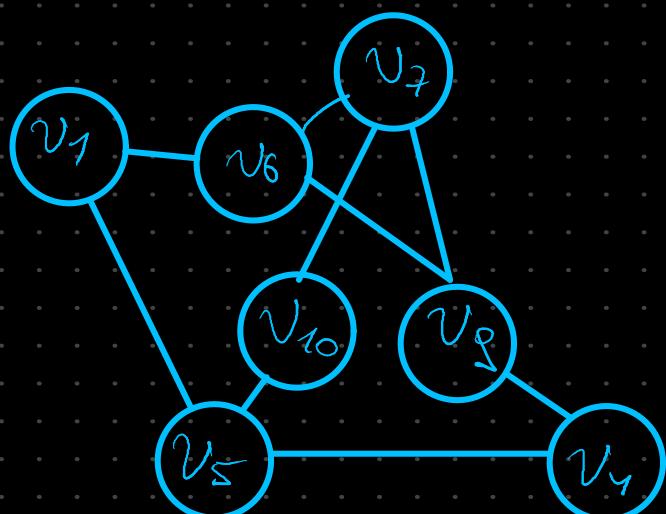


$$G_{57} = G_{55} \setminus \{e\}, G_{58} = G_{55} / \{e\}, e = (v_7, v_8)$$

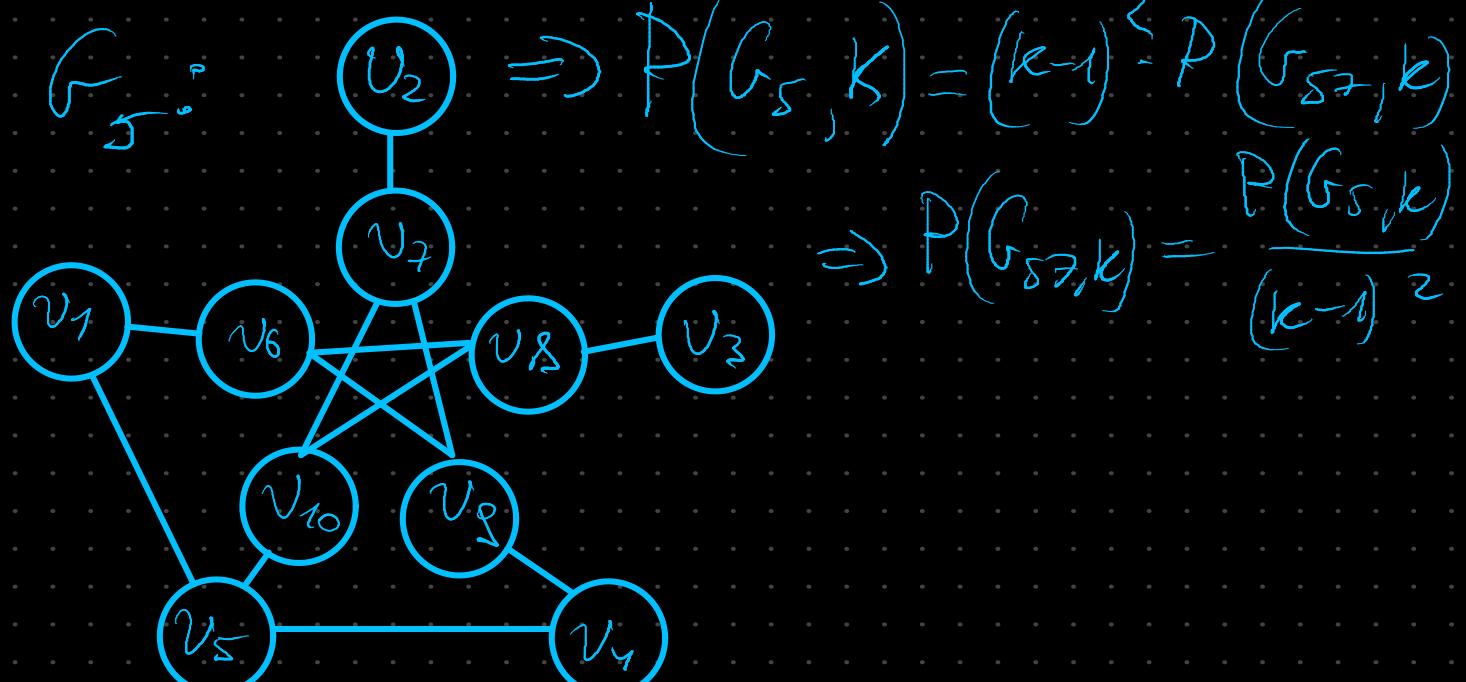
$$G_{57}:$$



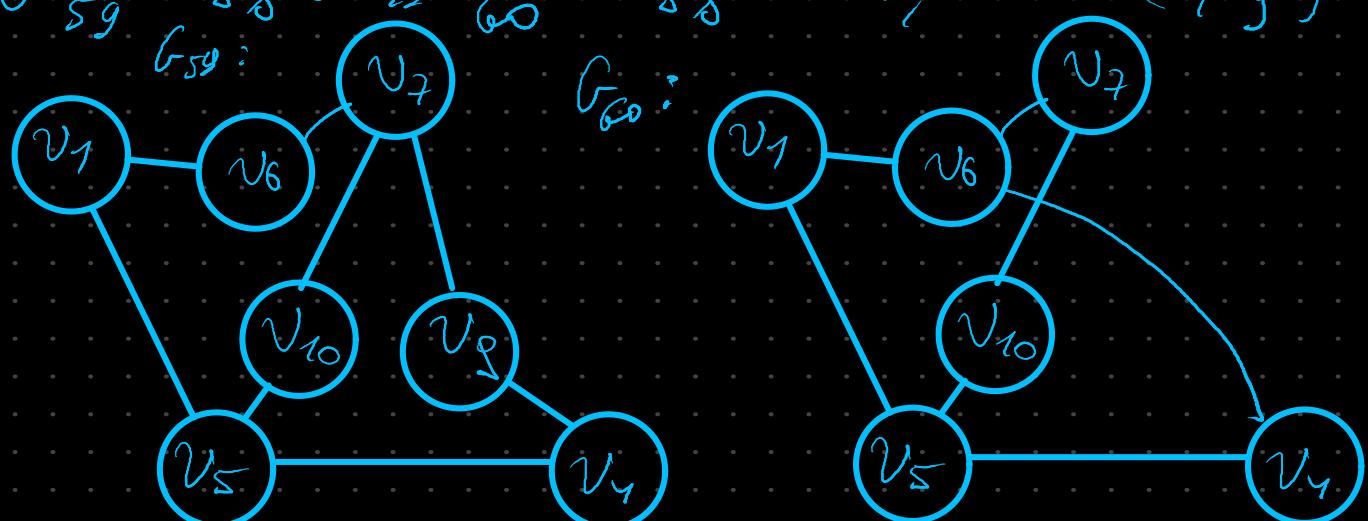
$$G_{58}:$$



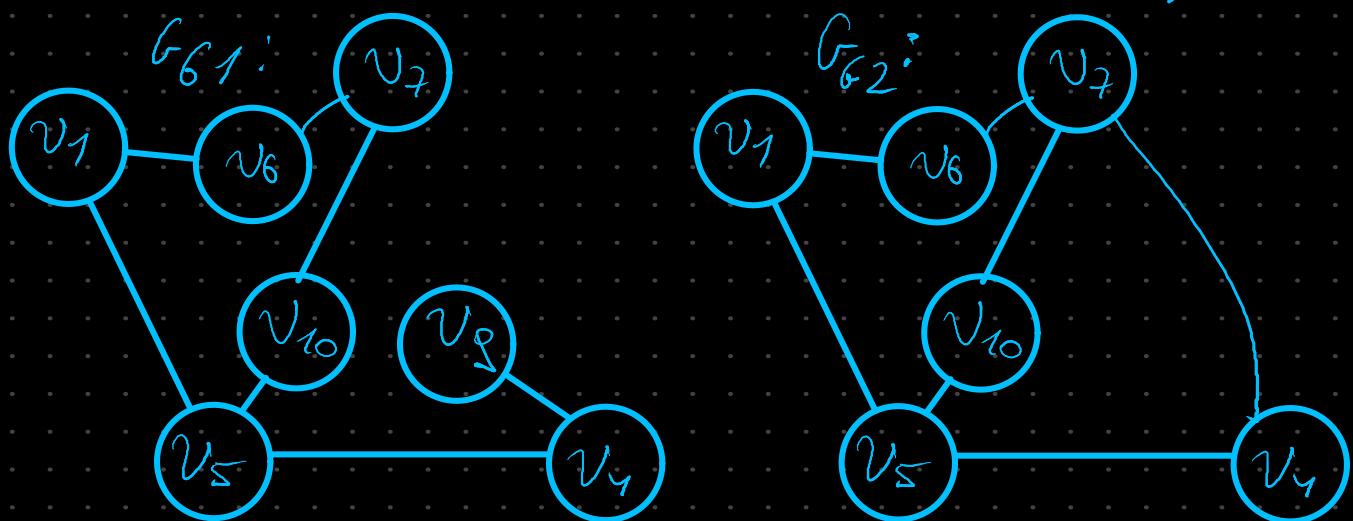
$$G_5: \quad \Rightarrow P(G_5, k) = (k-1)^3 \cdot P(G_{\delta 7}, k) \Rightarrow$$



$$G_{5g} = G_{5g} \setminus \{e\}, G_{60} = G_{5g} / \{e\}, e = (v_6, v_9)$$

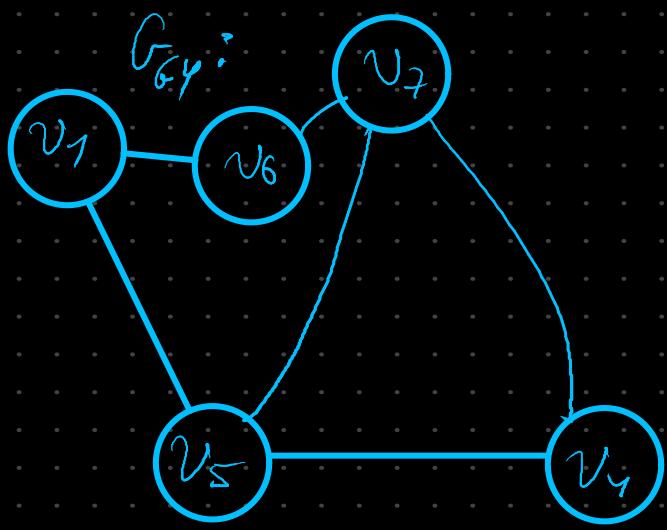
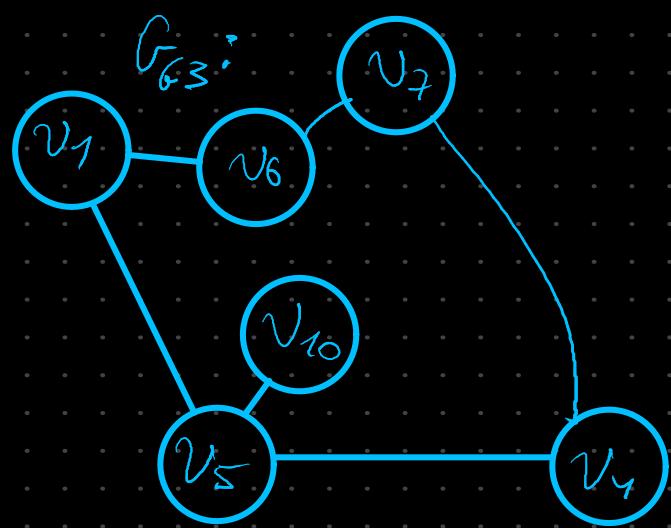


$$G_{61} = G_{5g} \setminus \{e\}, G_{62} = G_{5g} / \{e\}, e = (v_7, v_9)$$



$$P(G_{61}, k) = P(G_{\delta 7}, k) \cdot (k-1)^3 = (k-1)^3 ((k-1)^4 - 1)$$

$$G_{63} = G_{62} \setminus \{e\}, \quad G_{64} = G_{62} / \{e\}, \quad e = (v_7, v_{10})$$

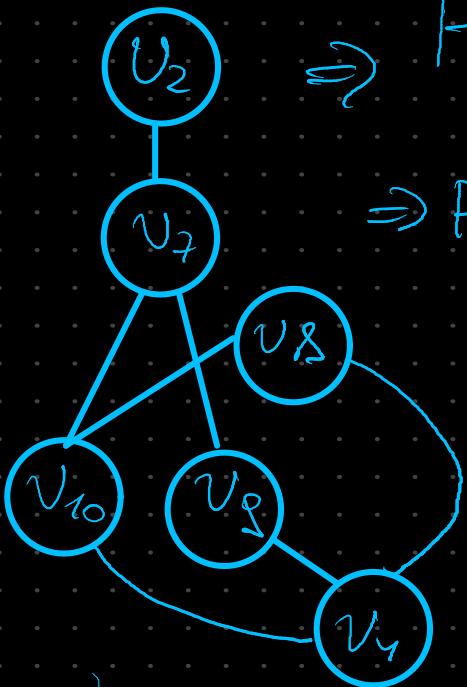


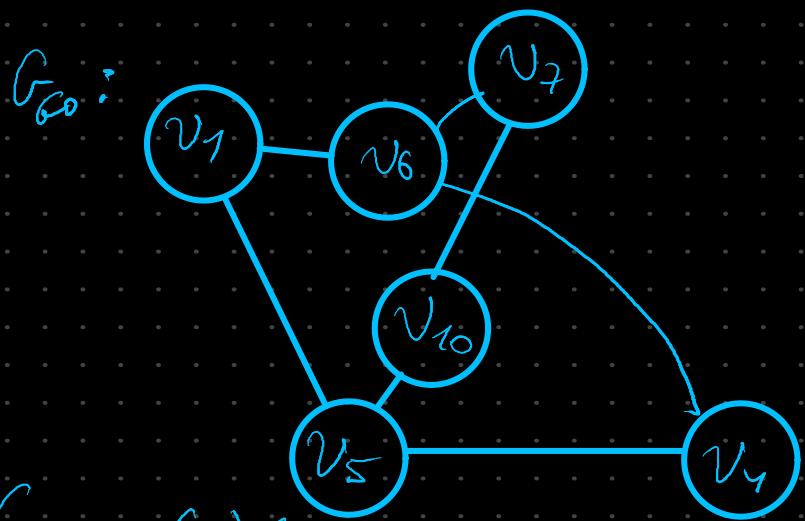
$$\begin{aligned} P(G_{63}, k) &= P(C_5, k) \cdot (k-1) = \\ &= (k-1)^2 \cdot ((k-1)^4 - 1) \end{aligned}$$

$G_{44}:$

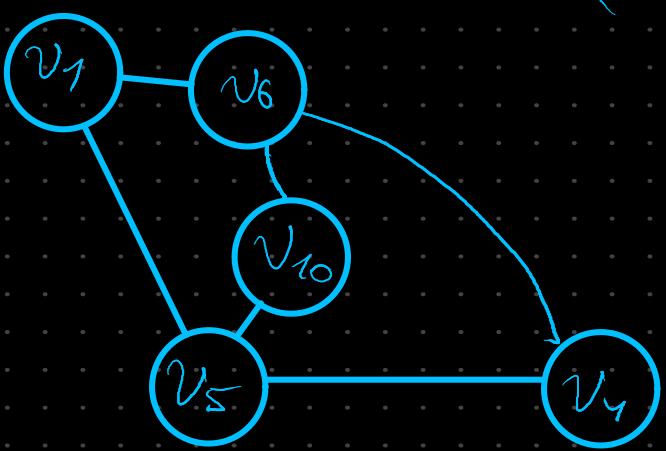
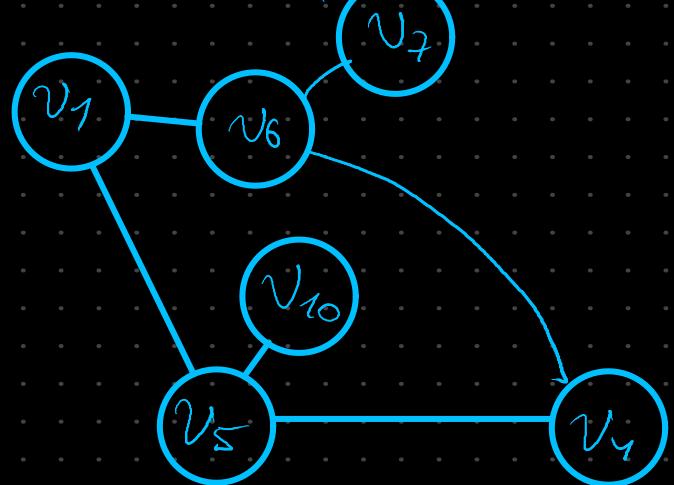
$$\Rightarrow P(G_{44}, k) = (k-1) P(G_{64}, k) \Rightarrow$$

$$\Rightarrow P(G_{64}, k) = \frac{P(G_{44}, k)}{k-1}$$

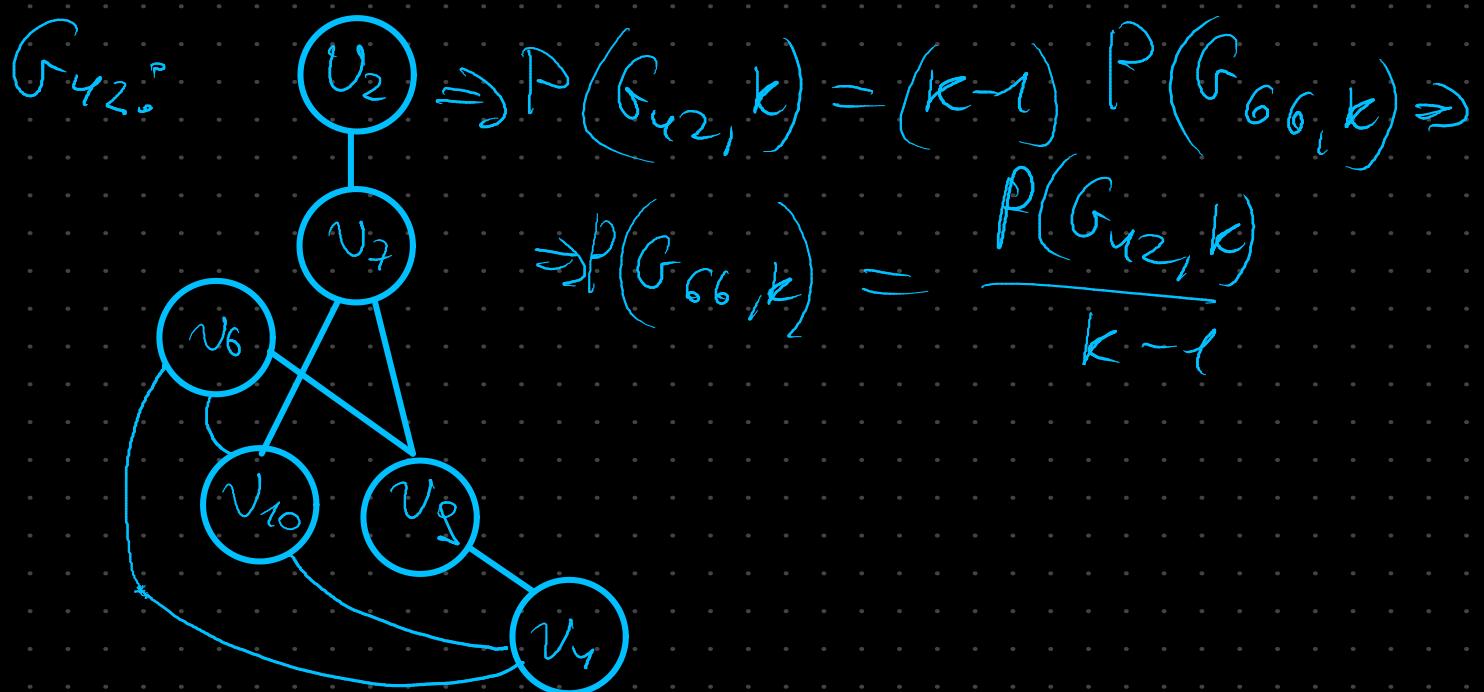


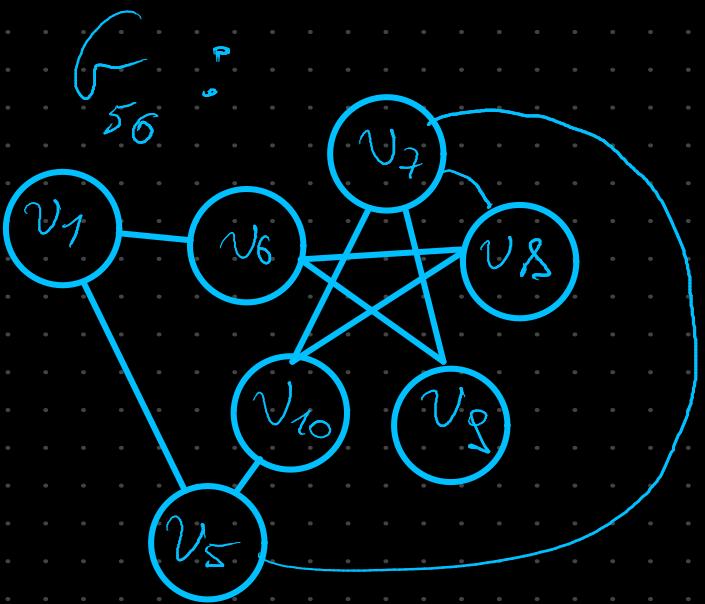


$$G_{65} = G_{60} / \{e\}, \quad e = (v_7, v_{10})$$



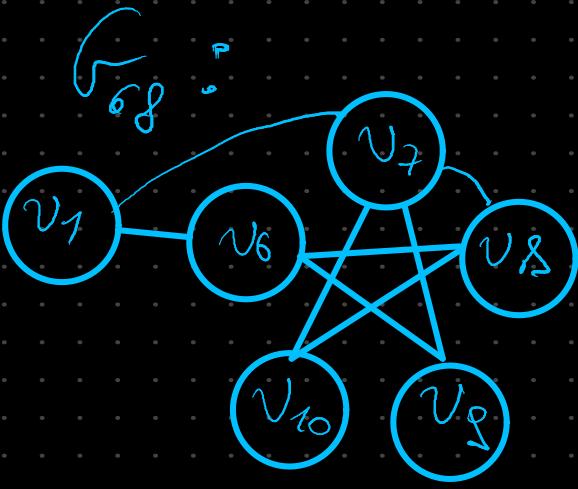
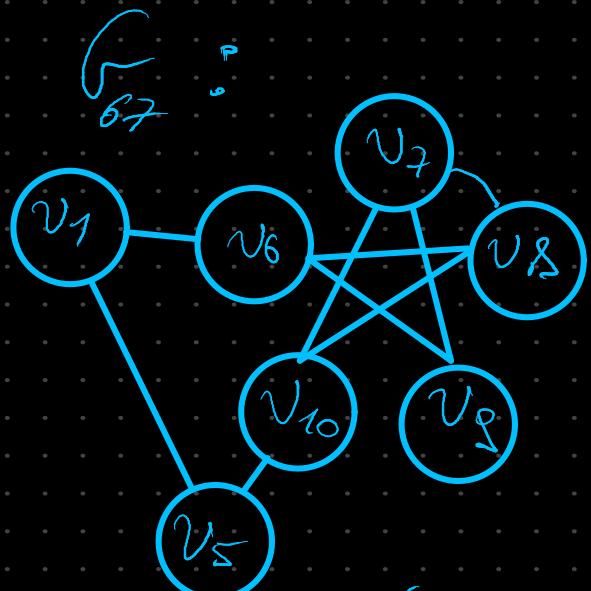
$$\begin{aligned} P(G_{65}, k) &= P(C_k, k) \cdot (k-1)^2 = \\ &= (k-1)^3 ((k-1)^3 + e) \end{aligned}$$



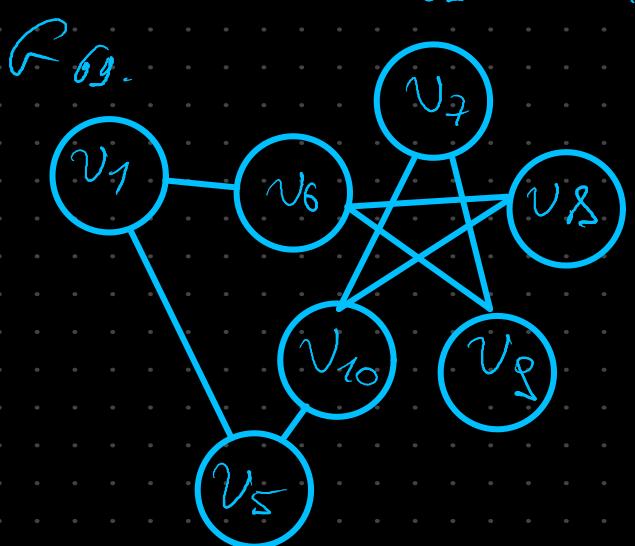


$$e = (v_7, v_9)$$

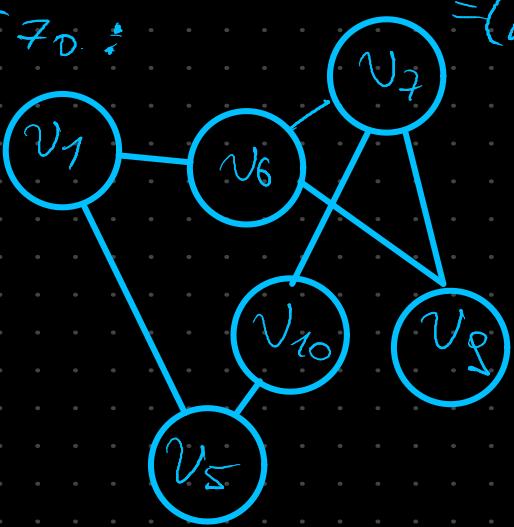
$$G_{67} = G_{56} \setminus \{e\}, \quad G_{68} = G_{56} / \{e\}$$



$$G_{69} = G_{67} \cup \{e\}, \quad G_{70} = G_{67} / \{e\}$$

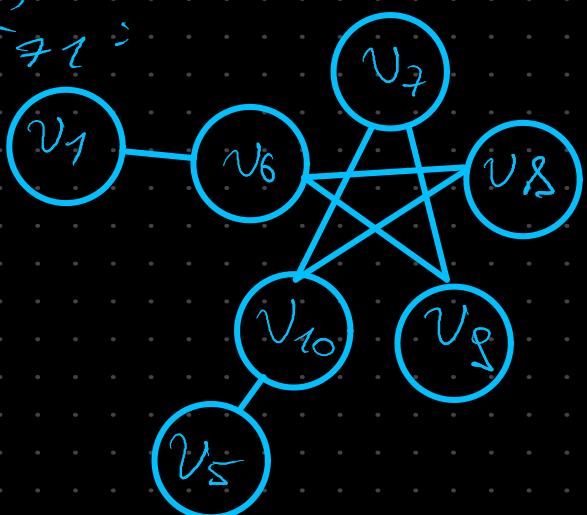


$$G_{70} = (v'_7, v_8)$$

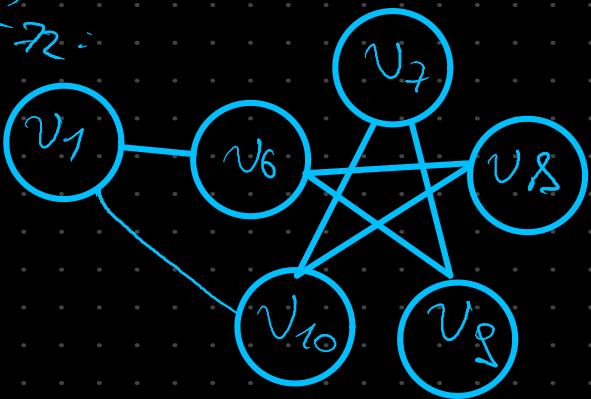


$$G_{71} = G_{69} \setminus \{e\}, G_{72} = G_{69} / \{e\}, e = (v_1, v_5)$$

$G_{71}:$



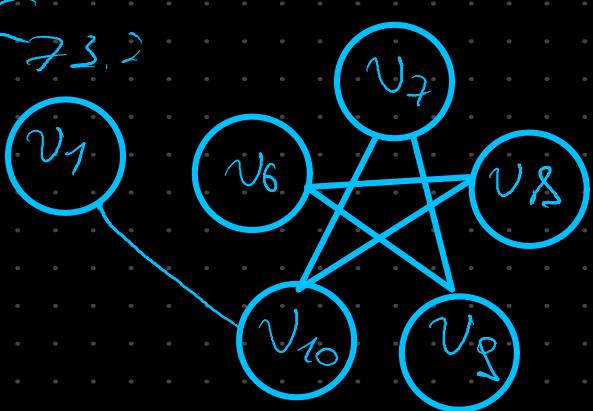
$G_{72}:$



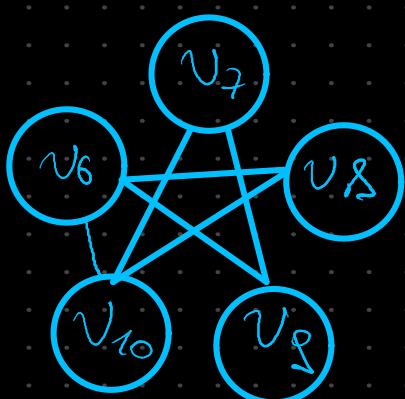
$$P(G_{71}, k) = (k-1)^2 \cdot P(S, k)$$

$$G_{73} = G_{72} \setminus \{e\}, G_{74} = G_{72} / \{e\}, e = (v_1, v_6)$$

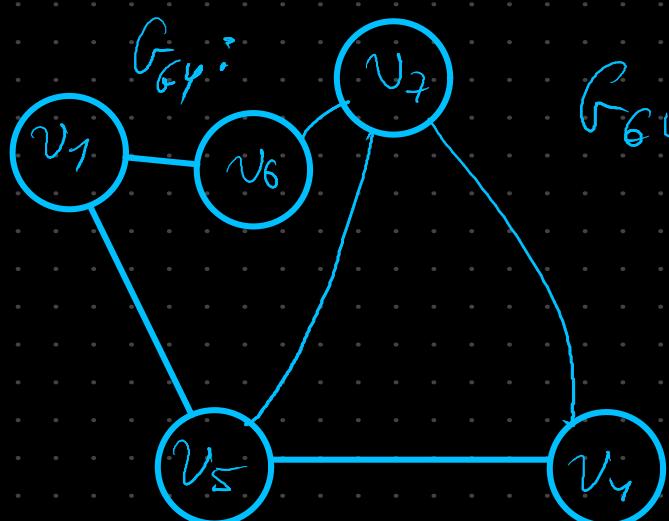
$G_{73}:$



$G_{74}:$

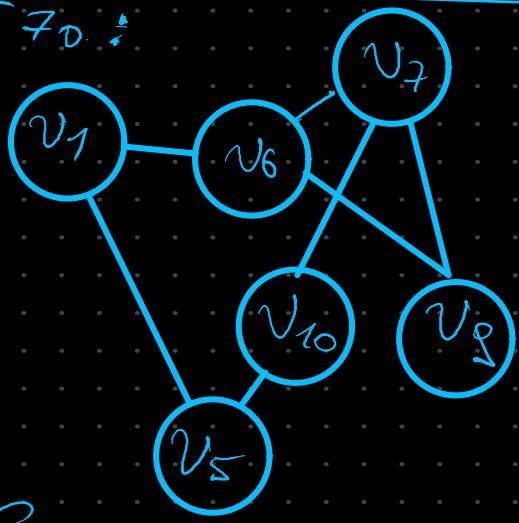


$$P(G_{73}, k) = (k-1) \cdot P(S, k)$$



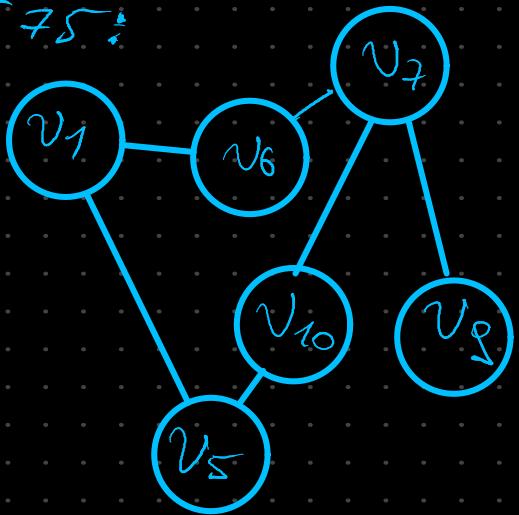
$$G_{64} \cong G_{74} \Rightarrow P(G_{74}, k) = P(G_{64}, k)$$

G_{7D} :

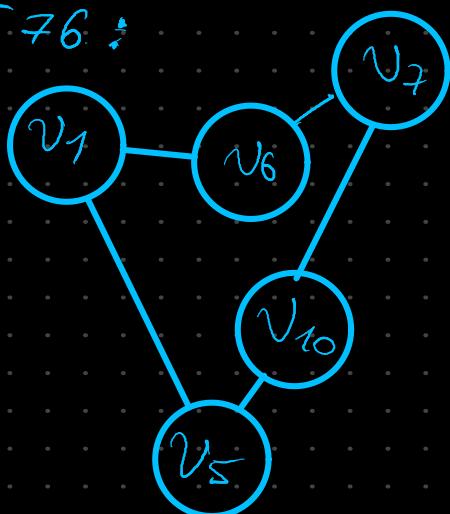


$$G_{7S} = G_{7D} \setminus \{e\}, G_{76} = G_{7D} / \{e\}, e = (v_6, v_8)$$

G_{7S} :

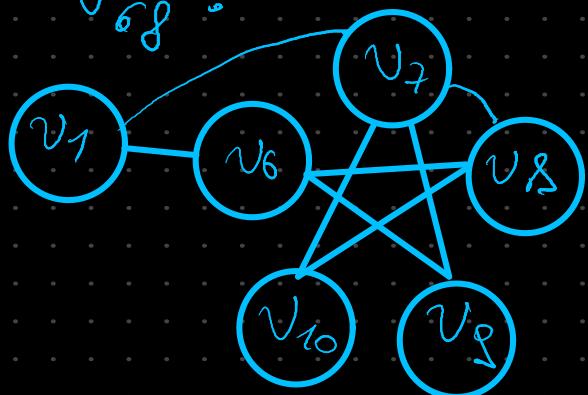


G_{76} :

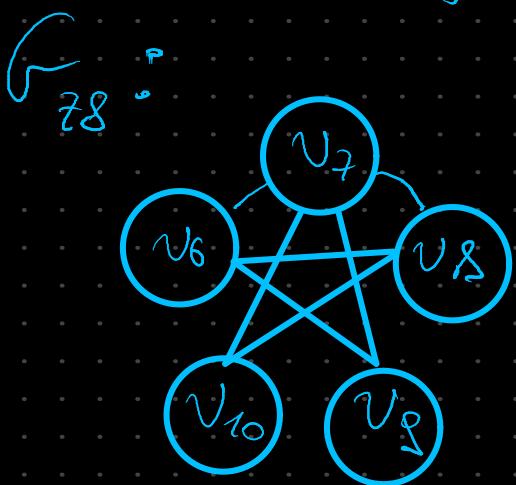
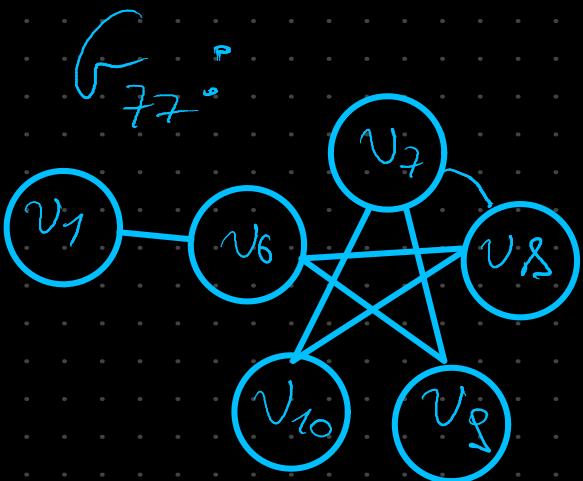


$$\begin{aligned} P(G_{7S}, k) &= (k-1) P(G_S, k) = \\ &= (k-1)^2 ((k-1)^k - 1) \end{aligned} \quad \left| \quad \begin{aligned} P(G_{76}, k) &= P(G_S) = \\ &= (k+1) ((k+1)^k - 1) \end{aligned} \right.$$

G_{68} :



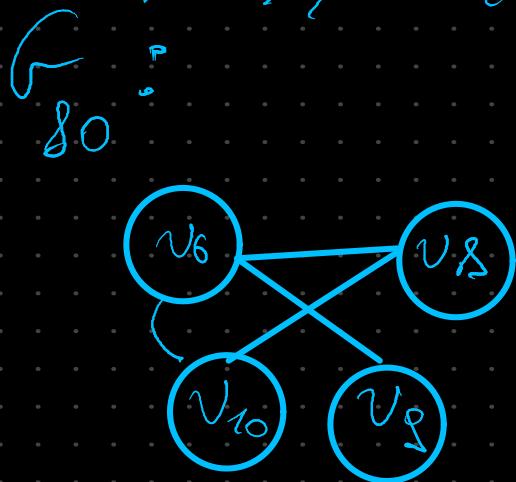
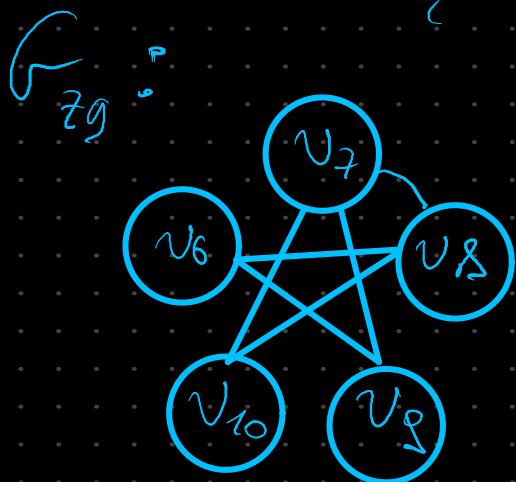
$$G_{77} = G_{68} \setminus \{e\}, \quad G_{78} = G_{68}/\{e\}, \quad e = (v_1, v_2)$$



$G_{37}:$

$$\Rightarrow G_{77} \cong G_{37} \Rightarrow P(G_{77}, k) = P(G_{37}, k)$$

$$G_{78} = G_{78} \setminus \{e\}, \quad G_{80} = G_{78}/\{e\}, \quad e = (v_6, v_7)$$



$$P(G_{77}, k) = (k-1) P(G_{79}, k) \Rightarrow P(G_{78}, k) = \frac{P(G_{77}, k)}{k-1}$$

$$P(G_{80}, k) = (k-1) P(G_{37}, k) = (k-1)^2 ((k-1)^2 - 1)$$

$$P(G, \kappa) = P(G_1, \kappa) - P(G_2, \kappa)$$

$$P(G_1, \kappa) = P(G_3, \kappa) - P(G_4, \kappa)$$

$$P(G_3, \kappa) = P(G_5, \kappa) - P(G_6, \kappa)$$

$$P(G_5, \kappa) = P(G_2, \kappa) - P(G_8, \kappa)$$

$$P(G_2, \kappa) = P(G_9, \kappa) - P(G_{10}, \kappa)$$

$$P(G_9, \kappa) = (k-1)^5 \cdot P(S, \kappa)$$

$$P(G_{10}, \kappa) = P(G_{11}, \kappa) - P(G_{12}, \kappa)$$

$$P(G_{11}, \kappa) = (k-1)^4 \cdot P(S, \kappa)$$

$$P(G_{12}, \kappa) = P(G_{13}, \kappa) - P(G_{14}, \kappa)$$

$$P(G_{13}, \kappa) = (k-1)^3 \cdot P(S, \kappa)$$

$$P(G_{14}, \kappa) = P(G_{15}, \kappa) - P(G_{16}, \kappa)$$

$$P(G_{15}, \kappa) = k(k-1)^6$$

$$P(G_{16}, \kappa) = k(k-1)^5$$

$$P(G_8, \kappa) = P(G_{17}, \kappa) - P(G_{18}, \kappa)$$

$$P(G_{17}, \kappa) = P(G_{19}, \kappa) - P(G_{20}, \kappa)$$

$$P(G_{19}, k) = (k-1)^4 \cdot P(S, k)$$

$$P(G_{20}, k) = P(G_{12}, k)$$

$$P(G_{18}, k) = P(G_{21}, k) - P(G_{22}, k)$$

$$P(G_{21}, k) = P(G_{23}, k) - P(G_{24}, k)$$

$$P(G_{23}, k) = (k-1)^3 \cdot P(S, k)$$

$$P(G_{24}, k) = P(G_{25}, k) - P(G_{26}, k)$$

$$P(G_{25}, k) = (k-1)^2 \cdot P(S, k)$$

$$P(G_{26}, k) = P(G_{27}, k) - P(G_{28}, k)$$

$$P(G_{27}, k) = k(k-1)^5$$

$$P(G_{28}, k) = k(k-1)^4$$

$$P(G_{22}, k) = P(G_{24}, k)$$

$$P(G_6, k) = P(G_{29}, k) - P(G_{30}, k)$$

$$P(G_{29}, k) = P(G_8, k)$$

$$P(G_{30}, k) = P(G_{31}, k) - P(G_{32}, k)$$

$$P(G_{31}, k) = P(G_{33}, k) - P(G_{34}, k)$$

$$P(G_{33}, \kappa) = P(G_{12}, \kappa) / (\kappa - 1)$$

$$P(G_{34}, \kappa) = P(G_{35}, \kappa) - P(G_{36}, \kappa)$$

$$P(G_{35}, \kappa) = P(G_{22}, \kappa)$$

$$P(G_{36}, \kappa) = P(G_{37}, \kappa) - P(G_{38}, \kappa)$$

$$P(G_{37}, \kappa) = P(G_{24}, \kappa) / (\kappa - 1)$$

$$P(G_{38}, \kappa) = P(G_{39}, \kappa) - P(G_{40}, \kappa)$$

$$P(G_{39}, \kappa) = (\kappa - 1)^2 ((\kappa - 1)^3 + 1)$$

$$P(G_{40}, \kappa) = \kappa (\kappa - 1)^3$$

$$P(G_{41}, \kappa) = P(G_{41}, \kappa) - P(G_{42}, \kappa)$$

$$P(G_{43}, \kappa) = P(G_{43}, \kappa) - P(G_{44}, \kappa)$$

$$P(G_{45}, \kappa) = P(G_{45}, \kappa) - P(G_{46}, \kappa)$$

$$P(G_{45}, \kappa) = (\kappa - 1)^4 ((\kappa - 1)^3 + 1)$$

$$P(G_{46}, \kappa) = (\kappa - 1)^3 ((\kappa - 1)^3 + 1)$$

$$P(G_{47}, \kappa) = P(G_{47}, \kappa) - P(G_{48}, \kappa)$$

$$P(G_{48}, \kappa) = (\kappa - 1)^2 ((\kappa - 1)^3 + 1)$$

$$P(G_{49}, \kappa) = (\kappa - 1)^2 ((\kappa - 1)^3 + 1)$$

$$P(G_{42}, k) = P(G_{43}, k) - P(G_{50}, k)$$

$$P(G_{43}, k) = P(G_{44}, k)$$

$$P(G_{50}, k) = P(G_{51}, k) - P(G_{52}, k)$$

$$P(G_{51}, k) = (k-1)^2 ((k-1)^2 + 1)$$

$$P(G_{52}, k) = k (k-1)^3$$

$$P(G_4, k) = P(G_{53}, k) - P(G_{54}, k)$$

$$P(G_{53}, k) = P(G_3, k) / (k-1)$$

$$P(G_{54}, k) = P(G_{55}, k) - P(G_{56}, k)$$

$$P(G_{55}, k) = P(G_{56}, k) - P(G_{57}, k)$$

$$P(G_{56}, k) = P(G_5, k) / (k-1)^2$$

$$P(G_{57}, k) = P(G_{58}, k) - P(G_{60}, k)$$

$$P(G_{58}, k) = P(G_{61}, k) - P(G_{62}, k)$$

$$P(G_{61}, k) = (k-1)^3 ((k-1)^4 - 1)$$

$$P(G_{62}, k) = P(G_{63}, k) - P(G_{64}, k)$$

$$P(G_{63}, k) = (k-1)^2 ((k-1)^4 - 1)$$

$$P(G_{64}, k) = P(G_{44}, k) / (k-1)$$

$$P(G_{60}, \kappa) = P(G_{65}, \kappa) - P(G_{66}, \kappa)$$

$$P(G_{65}, \kappa) = (\kappa-1)^3 ((\kappa-1)^3 + 1)$$

$$P(G_{66}, \kappa) = P(G_{62}, \kappa) / (\kappa-1)$$

$$P(G_{67}, \kappa) = P(G_{67}, \kappa) - P(G_{68}, \kappa)$$

$$P(G_{68}, \kappa) = P(G_{69}, \kappa) - P(G_{70}, \kappa)$$

$$P(G_{69}, \kappa) = P(G_{71}, \kappa) - P(G_{72}, \kappa)$$

$$P(G_{71}, \kappa) = P(S, \kappa) \cdot (\kappa-1)^2$$

$$P(G_{72}, \kappa) = P(G_{73}, \kappa) - P(G_{74}, \kappa)$$

$$P(G_{73}, \kappa) = P(S, \kappa) \cdot (\kappa-1)$$

$$P(G_{74}, \kappa) = P(G_{64}, \kappa)$$

$$P(G_{75}, \kappa) = P(G_{75}, \kappa) - P(G_{76}, \kappa)$$

$$P(G_{75}, \kappa) = (\kappa-1)^2 ((\kappa-1)^4 - 1)$$

$$P(G_{76}, \kappa) = (\kappa-1) ((\kappa-1)^4 - 1)$$

$$P(G_{77}, \kappa) = P(G_{77}, \kappa) - P(G_{78}, \kappa), P(G_{77}, \kappa) = P(G_{37}, \kappa)$$

$$P(G_{78}, \kappa) = P(G_{79}, \kappa) - P(G_{80}, \kappa)$$

$$P(G_{79}, \kappa) = P(G_{77}, \kappa) \setminus (\kappa-1), P(G_{80}, \kappa) = (\kappa-1)^2 ((\kappa-1)^2 - 1)$$

$$P(S, k) = k(k-2)(k^3 - 3k^2 + 4k - 2)$$

$$P(G_{28}, k) = k(k-1)^4$$

$$P(G_{27}, k) = k(k-1)^5$$

$$P(G_{26}, k) = P(G_{27}, k) - P(G_{28}, k) = k(k-1)^4(k-2)$$

$$P(G_{25}, k) = (k-1)^2 \cdot P(S, k)$$

$$P(G_{24}, k) = P(G_{25}, k) - P(G_{26}, k) = (k-1)^2 (P(S, k) - k(k-1)^2(k-2))$$

$$P(G_{23}, k) = (k-1)^3 \cdot P(S, k)$$

$$P(G_{21}, k) = P(G_{23}, k) - P(G_{24}, k) =$$

$$= (k-1)^2 (P(S, k)(k-1) - P(S, k) + k(k-1)^2(k-2))$$

$$P(G_{22}, k) = P(G_{24}, k) = (k-1)^2 (P(S, k) - k(k-1)^2(k-2))$$

$$P(G_{18}, k) = P(G_{21}, k) - P(G_{22}, k) = (k-1)^2 \cdot$$

$$\cdot (P(S, k)(k-1) - P(S, k) + k(k-1)^2(k-2) - (P(S, k) - k(k-1)^2(k-2)))$$

$$P(G_{20}, k) = P(G_{12}, k) = (k-1)^3 (P(S, k) - k(k-1)^2(k-2))$$

$$P(G_{19}, k) = (k-1)^4 \cdot P(S, k)$$

$$\begin{aligned}
 P(G_{12}, k) &= P(G_{13}, k) - P(G_{15}, k) = (k-1)^3 \left((k-1) P(S, k) - P(S, k) + k(k-1)^2(k-2) \right) \\
 P(G_8, k) &= P(G_{17}, k) - P(G_{18}, k) = (k-1)^3 \left((k-1) P(S, k) - P(S, k) + k(k-1)^2(k-2) \right) = \\
 (k-1)^2 \cdot & \left(P(S, k)(k-1) - P(S, k) + k(k-1)^2(k-2) - \left(P(S, k) - k(k-1)^2(k-2) \right) \right) = \\
 = (k-1)^2 \left((k-1)^2 P(S, k) - P(S, k)(k-1) + k(k-1)^3(k-2) - P(S, k)(k-1) + 2P(S, k) + \right. \\
 \left. - 2k(k-1)^2(k-2) \right) &= k(k-1)^2 \left(k^6 - 8k^5 + 36k^4 - 82k^3 + 111k^2 - 83k + 26 \right) = \\
 = k(k-1)^3(k-2) \left(k^4 - 6k^3 + 16k^2 - 22k + 13 \right) & \\
 P(G_{16}, k) &= k(k-1)^5 \\
 P(G_{15}, k) &= k(k-1)^6 \\
 P(G_{14}, k) &= P(G_{15}, k) - P(G_{16}, k) = k(k-1)^5(k-2) \\
 P(G_{13}, k) &= (k-1)^3 \cdot P(S, k)
 \end{aligned}$$

$$P(G_{12}, k) = P(G_{13}, k) - P(G_{14}, k) = (k-1)^3 \left(P(S, k) - k(k-1)(k-2) \right)$$

$$= k(k-1)^4(k-2) (k^2 - 3k + 3)$$

$$P(G_1, k) = (k-1)^4 \cdot P(S, k) =$$

$$= k(k-1)^4(k-2) (k^3 - 3k^2 + 4k - 2)$$

$$P(G_{10}, k) = P(G_1, k) - P(G_{12}, k) =$$

$$= k(k-1)^4(k-2) (k^3 - 4k^2 + 7k - 5)$$

$$P(G_9, k) = (k-1)^5 \cdot P(S, k) =$$

$$= k(k-1)^5(k-2) (k^3 - 3k^2 + 4k - 2)$$

$$P(G_7, k) = P(G_9, k) - P(G_{10}, k) =$$

$$= k(k-1)^4(k-2) (k^4 - 3k^3 + 4k^2 - 2k -$$

$$- k^3 + 3k^2 - 4k + 2 - (k^3 - 4k^2 + 7k - 5)) =$$

$$= k(k-1)^4(k-2) (k^4 - 5k^3 + 11k^2 - 13k + 7)$$

$$P(F_5, k) = P(F_2, k) - P(F_8, k) =$$

$$k(k-1)^2(k-2)(k^4 - 5k^3 + 11k^2 - 13k + 7) -$$

$$- k(k-1)^3(k-2)(k^4 - 6k^3 + 16k^2 - 22k + 13) =$$

$$= k(k-1)^2(k-2)(k^5 - 5k^4 + 11k^3 - 13k^2 + 7k - 2k^4 + 10k^3 - 22k^2 + 26k - 14 - k^4 + 6k^3 - 16k^2 + 22k - 13) = k(k-1)^3(k-2) \cdot$$

$$\bullet (k^5 - 7k^4 + 22k^3 - 40k^2 + 42k - 20) =$$

$$= k(k-1)^3(k-2)^2(k^4 - 5k^3 + 12k^2 - 16k + 10)$$

$$P(F_{40}, k) = k(k-1)^3$$

$$P(F_{38}, k) = (k-1)^2((k-1)^3 + 1)$$

$$P(F_{38}, k) = P(F_{38}, k) - P(F_{40}, k) =$$

$$= (k-1)^2 \left((k-1)^3 + 1 - k(k-1) \right) =$$

$$= (k-1)^2 (k^3 - 3k^2 + 3k - k^2 + k) = (k-1)^2 k (k-2)^2$$

$$P(F_{37}, k) = P(F_{38}, k) / (k-1) = \frac{(k-1)^2 (P(S, k) - k(k-1)^2(k-2))}{k-1}$$

$$= (k-1) (P(S, k) - k(k-1)^2(k-2)) =$$

$$= (k-1) ((k-1)^5 - (k-1) - k(k-1)^2(k-2)) = (k-1)^2 \cdot ((k-1)^4 - 1 - k(k-1)(k-2)) =$$

$$= (k-1)^2 ((k-2)k((k-1)^2 + 1) - k(k-1)(k-2)) =$$

$$= k(k-1)^2(k-2) (k^2 - 2k + 2 - k + 1) =$$

$$= k(k-1)^2(k-2) (k^2 - 3k + 3)$$

$$P(F_{36}, k) = P(F_{37}, k) - P(F_{38}, k) =$$

$$= k(k-1)^2(k-2) (k^2 - 3k + 3) - (k-1)^2 k (k-2)^2 =$$

$$= k(k-1)^2(k-2) (k^2 - 4k + 5)$$

$$P(G_{35}, k) = P(G_{22}, k) = (k-1)^2 (P(S, k) - k(k-1)^2(k-2)) =$$

$$= (k-1)^2 \left((k-1)^5 - (k-1) - k(k-1)^2(k-2) \right) =$$

$$= (k-1)^3 \left(k^4 - 4k^3 + 6k^2 - 4k + 1 - 1 - k^3 + 3k^2 - 2k \right) =$$

$$= k(k-1)^3 \left(k^3 - 5k^2 + 8k - 6 \right) =$$

$$= k(k-1)^3(k-2)(k^2 - 3k + 3)$$

$$P(G_{34}, k) = P(G_{35}, k) - P(G_{36}, k) =$$

$$k(k-1)^3(k-2)(k^2 - 3k + 3) -$$

$$- k(k-1)^2(k-2) (k^2 - 4k + 5) =$$

$$= k(k-1)^2(k-2) \left((k-1)(k^2 - 3k + 3) - (k^2 - 4k + 5) \right) =$$

$$= k(k-1)^2(k-2) \left(k^3 - 3k^2 + 3k - k^2 + 3k - 3 - k^2 + 4k - 5 \right) =$$

$$= k(k-1)^2(k-2) (k^3 - 5k^2 + 10k - 8) =$$

$$= k(k-1)^2(k-2)^2 (k^2 - 3k + 4)$$

$$P(G_{33}, k) = P(G_{12}, k) / (k-1) =$$

$$= \frac{(k-1)^3((k-1)P(S,k) - P(S,k) + k(k-1)^2(k-2))}{k-1} =$$

$$= k(k-1)^3(k-2)(k^3 - 4k^2 + 7k - 5)$$

$$P(G_{31},k) = P(G_{33},k) - P(G_{34},k) =$$

$$= k(k-1)^2(k-2) \cdot (k^4 - 6k^3 + 16k^2 - 22k + 13)$$

$$P(G_{48},k) = (k-1)^2((k-1)^3 + 1)$$

$$P(G_{42},k) = (k-1)^3((k-1)^3 + 1)$$

$$P(G_{44},k) = P(G_{47},k) - P(G_{48},k) = (k-1)^2((k-1)^3 + 1).$$

$$\cdot (k-1-1) = (k-1)^2(k^3 - 3k^2 + 3k)(k-2) =$$

$$= k(k-1)^2(k-2)(k^2 - 3k + 3)$$

$$P(G_{46},k) = (k-1)^3((k-1)^3 + 1)$$

$$P(G_{45},k) = (k-1)^4((k-1)^3 + 1)$$

$$P(G_{43},k) = P(G_{47},k) - P(G_{46},k) =$$

$$= k(k-1)^3(k-2)(k^2 - 3k + 3)$$

$$P(G_{u_3}, k) = P(G_{u_3}, k) - P(G_{u_3}, k) =$$

$$= k(k-1)^3(k-2)(k^2-3k+3) -$$

$$- k(k-1)^2(k-2)(k^2-3k+3) =$$

$$= k(k-1)^2(k-2)^2(k^2-3k+3)$$

$$P(G_{s_2}, k) = k(k-1)^3$$

$$P(G_{s_1}, k) = (k-1)^2((k-1)^2 + 1)$$

$$P(G_{s_0}, k) = P(G_{s_1}, k) - P(G_{s_2}, k) = (k-1)^2 \cdot ($$

$$k^3 - 3k^2 + 3k - k^2 + k) = k(k-1)^2(k-2)^2$$

$$P(G_{u_4}, k) = P(G_{u_4}, k) = k(k-1)^2(k-2)(k^2-3k+3)$$

$$P(G_{u_2}, k) = P(G_{u_2}, k) - P(G_{s_0}, k) =$$

$$= k(k-1)^2(k-2)(k^2-3k+3) - k(k-1)^2(k-2)^2 =$$

$$= k(k-1)^2(k-2)(k^2-4k+5)$$

$$P(G_{32}, k) = P(G_{41}, k) - P(G_{42}, k) =$$

$$= k(k-1)^2(k-2)^2(k^2 - 3k + 3) -$$

$$- k(k-1)^2(k-2)(k^2 - 4k + 5) =$$

$$= k(k-1)^2(k-2)(k^3 - 3k^2 + 3k - 2k^2 + 6k - 6 - \\ - k^2 + 4k - 5) = k(k-1)^2(k-2)(k^3 - 6k^2 + 13k - 11)$$

$$P(G_{30}, k) = P(G_{31}, k) - P(G_{32}, k) =$$

$$k(k-1)^2(k-2) \cdot (k^4 - 6k^3 + 16k^2 - 22k + 13) -$$

$$- k(k-1)^2(k-2)(k^3 - 6k^2 + 13k - 11) =$$

$$= k(k-1)^2(k-2)(k^4 - 7k^3 + 22k^2 - 35k + 24)$$

$$P(G_{29}, k) = P(G_8, k) =$$

$$= k(k-1)^3(k-2)(k^4 - 6k^3 + 16k^2 - 22k + 13)$$

$$P(G_6, k) = P(G_{29}, k) - P(G_{30}, k) =$$

$$= k(k-1)^2(k-2)(k^5 - 8k^4 + 28k^3 - 60k^2 + 70k - 37)$$

$$P(G_3, k) = P(G_5, k) - P(G_6, k) =$$

$$= k(k-1)^2(k-2)(k^6 - 9k^5 + 37k^4 - 81k^3 + 142k^2 - 132k + 57)$$

$$P(G_{27}, k) = P(G_{37}, k) = k(k-1)^2(k-2)(k^2 - 3k + 3)$$

$$P(G_{80}, k) = (k-1)^2(k-1)^2 - 1$$

$$P(G_{79}, k) = P(G_{77}, k) \setminus (k-1) = k(k-1)(k-2)(k^2 - 3k + 3)$$

$$P(G_{78}, k) = P(G_{79}, k) - P(G_{80}, k) = k(k-1)(k-2)^3$$

$$P(G_{68}, k) = P(G_{77}, k) - P(G_{78}, k) =$$

$$= k(k-1)(k-2)(k^3 - 5k^2 + 10k - 7)$$

$$P(G_{76}, k) = (k-1)((k-1)^4 - 1) =$$

$$= k(k-1)(k-2)(k^2 - 2k + 2)$$

$$P(G_{78}, k) = (k-1)^2((k-1)^4 - 1) =$$

$$= k(k-1)^2(k-2)(k^2 - 2k + 2)$$

$$P(G_{70}, k) = P(G_{75}, k) - P(G_{76}, k) =$$

$$= k(k-1)(k-2)^2 (k^2 - 2k + 2)$$

$$P(G_{64}, k) = P(G_{44}, k) / (k-1) =$$

$$= k(k-1)(k-2)(k^2 - 3k + 3)$$

$$P(G_{74}, k) = P(G_{64}, k) = k(k-1)(k-2)(k^2 - 3k + 3)$$

$$P(G_{73}, k) = P(S, k) \cdot (k-1) =$$

$$= k(k-1)^2(k-2)(k^2 - 2k + 2)$$

$$P(G_{72}, k) = P(G_{73}, k) - P(G_{74}, k) =$$

$$= k(k-1)(k-2)(k^3 - 4k^2 + 7k - 5)$$

$$P(G_{71}, k) = P(S, k) \cdot (k-1)^2 =$$

$$= k(k-1)^3(k-2)(k^2 - 2k + 2)$$

$$P(G_{69}, k) = P(G, k) - P(G_{72}, k) =$$

$$= k(k-1)(k-2)(k^4 - 5k^3 + 11k^2 - 13k + 7)$$

$$P(F_{67}, k) = P(F_{68}, k) - P(F_{70}, k) = \\ = k(k-1)(k-2)(k^4 - 6k^3 + 18k^2 - 19k + 11)$$

$$P(F_{56}, k) = P(F_{67}, k) - P(F_{68}, k) = \\ = k(k-1)(k-2)^2(k^3 - 5k^2 + 10k - 8)$$

$$P(F_{66}, k) = P(F_{62}, k)/(k-1) = \\ = k(k-1)(k-2)(k^2 - 4k + 5)$$

$$P(F_{62}, k) = (k-1)^3((k-1)^3 + 1)$$

$$P(F_{60}, k) = P(F_{65}, k) - P(F_{66}, k) = \\ = k(k-1)(k^4 - 6k^3 + 16k^2 - 22k + 13)$$

$$P(F_{63}, k) = (k-1)^2((k-1)^4 - 1) = \\ = k(k-1)^2(k-2)(k^2 - 2k + 2)$$

$$P(F_{62}, k) = P(F_{63}, k) - P(F_{64}, k) = \\ = k(k-1)(k-2)(k^3 - 4k^2 + 7k - 5)$$

$$P(G_{61}, k) = (k-1)^3 ((k-1)^4 - 1) = \\ = k(k-1)^3 (k-2)(k^2 - 2k + 2)$$

$$P(G_{53}, k) = P(G_{61}, k) - P(G_{62}, k) = \\ = k(k-1)(k-2)(k^4 - 5k^3 + 11k^2 - 13k + 7)$$

$$P(G_{58}, k) = P(G_{53}, k) - P(G_{60}, k) = \\ = k(k-1)(k-2)^3 (k^2 - 2k + 3)$$

$$P(G_{52}, k) = P(G_5, k) / (k-1)^2 = \\ = k(k-1)(k-2)^2 (k^4 - 5k^3 + 12k^2 - 16k + 10) \\ P(G_{55}, k) = P(G_5, k) - P(G_{58}, k) = \\ = k(k-1)(k-2)^2 (k^4 - 6k^3 + 16k^2 - 23k + 16)$$

$$P(G_{59}, k) = P(G_{55}, k) - P(G_{58}, k) \\ = k(k-1)(k-2)^2 (k^4 - 7k^3 + 21k^2 - 33k + 25)$$

$$P(G_3, k) = P(G_3, k) / (k-1) =$$

$$= k(k-1)(k-2)(10k^3 - 3k + 3)(k^4 - 6k^3 + 16k^2 - 25k + 19)$$

$$P(G_4, k) = P(G_3, k) - P(G_3, k) =$$

$$= k(k-1)(k-2)(k^6 - 10k^5 - 46k^4 - 126k^3 + \\+ 217k^2 - 223k + 107)$$

$$P(G_1, k) = P(G_3, k) - P(G_4, k) =$$

$$= k(k-1)(k-2)^2 (k^6 - 9k^5 + 38k^4 - \\- 98k^3 + 163k^2 - 165k + 82)$$

$$P(G, k) = P(G_1, k) - P(G_2, k) =$$

$$= k(k-1)(k-2)^2 (k^6 - 9k^5 + 38k^4 - \\- 98k^3 + 163k^2 - 165k + 82) -$$

$$= k(k-1)(k-2) (k^6 - 11k^5 + 56k^4 - \\- 170k^3 + 323k^2 - 363k + 188) =$$

$$= k(k-1)(k-2) (k^7 - 12k^6 + 67k^5 - \\- 230k^4 + 523k^3 - 814k^2 + 775k - 352)$$

1) Тому ж, чо $P(G, k) =$
 $= k(k-1)(k-2)(k^7 - 12k^6 + 67k^5 -$
 $- 230k^4 + 523k^3 - 814k^2 + 775k - 352)$

2) $\left\{ \begin{array}{l} P(G, 0) = 0 \\ P(G, 1) = 0 \\ P(G, 2) = 0 \\ P(G, 3) = 120 \neq 0 \end{array} \right| \Rightarrow \chi(G) = 3$