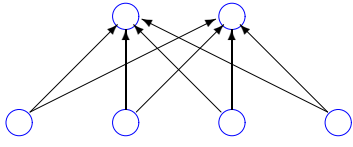



# Сеть Кохонена


Для обучения сети SOFM, имеющей четыре входных элемента и два кластерных, используются четыре образца, закодированные 1 (закрашенный квадрат) и 0 (пустой квадрат) слева направо, сверху вниз. Даны начальные весовые значения  $W_{i,j}$  и норма обучения  $\eta$ . Используя евклидову метрику, определить принадлежность образцов кластерным элементам и вычислить весовые значения после первого цикла обработки данных.


**Задача 9.1**


$\eta = 0.5$



1) 

2) 

3) 

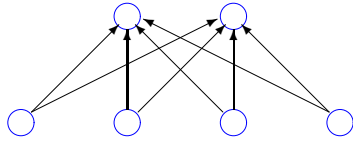
4) 


$$W = \begin{vmatrix} 0.1 & 0.8 & 0.8 & 0.6 \\ 0.4 & 0.6 & 0.4 & 0.2 \end{vmatrix}$$


9.2


**Задача 9.2**


$\eta = 0.5$



1) 

2) 

3) 

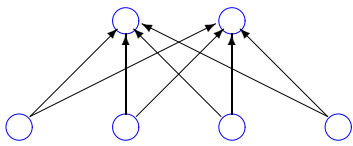
4) 


$$W = \begin{vmatrix} 0.1 & 0.6 & 0.5 & 0.1 \\ 0.1 & 0.5 & 0.5 & 0.2 \end{vmatrix}$$


9.2


**Задача 9.3**


$\eta = 0.5$



1) 

2) 

3) 

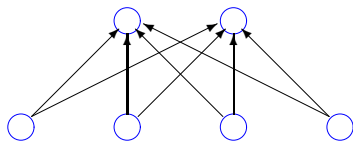
4) 


$$W = \begin{vmatrix} 0.5 & 0.6 & 0.1 & 0.6 \\ 0.6 & 0.4 & 0.2 & 0.6 \end{vmatrix}$$


9.2


**Задача 9.4**


$\eta = 0.6$



1) 

2) 

3) 

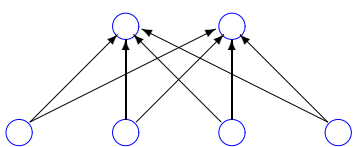
4) 


$$W = \begin{vmatrix} 0.3 & 0.2 & 1 & 0.5 \\ 0.3 & 0.4 & 0.7 & 0.4 \end{vmatrix}$$


9.2


**Задача 9.5**


$\eta = 0.4$



1) 

2) 

3) 

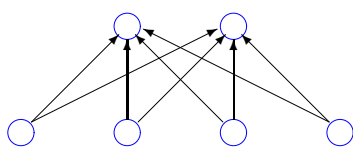
4) 


$$W = \begin{vmatrix} 0.4 & 0.1 & 0.3 & 0.8 \\ 0.3 & 1 & 0.9 & 0.5 \end{vmatrix}$$


9.2


**Задача 9.6**


$\eta = 0.5$



1) 

2) 

3) 

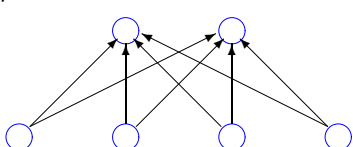
4) 


$$W = \begin{vmatrix} 0.2 & 0.9 & 0.9 & 1 \\ 0.7 & 0.8 & 0.8 & 0.3 \end{vmatrix}$$


9.2


**Задача 9.7**


$\eta = 0.5$



1) 

2) 

3) 

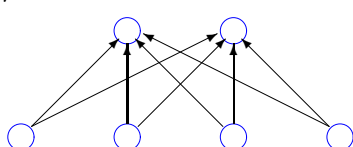
4) 


$$W = \begin{vmatrix} 0.4 & 0.5 & 0.5 & 0.6 \\ 0.5 & 0.7 & 0.9 & 0.5 \end{vmatrix}$$


9.2


**Задача 9.8**


$\eta = 0.7$



1) 

2) 

3) 

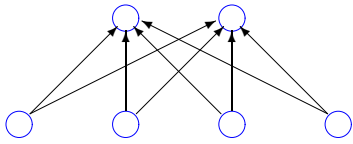
4) 

$$W = \begin{vmatrix} 0.3 & 0.3 & 0.7 & 1 \\ 0.1 & 0.2 & 0.2 & 0.4 \end{vmatrix}$$

9.2

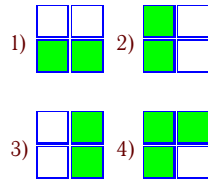
**Задача 9.9**

$\eta = 0.7$



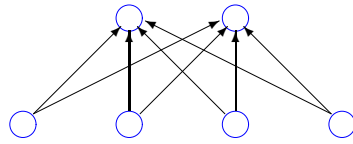
$$W = \begin{vmatrix} 0.6 & 0.3 & 0.2 & 0.4 \\ 0.3 & 0.9 & 0.7 & 0.7 \end{vmatrix}$$

9.2



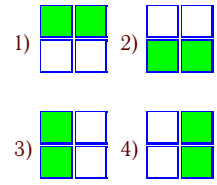
**Задача 9.10**

$\eta = 0.5$



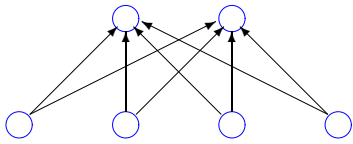
$$W = \begin{vmatrix} 0.3 & 0.8 & 0.3 & 0.7 \\ 0.6 & 1 & 0.4 & 0.4 \end{vmatrix}$$

9.2



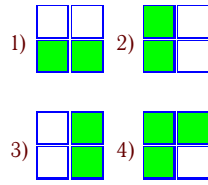
**Задача 9.11**

$\eta = 0.6$



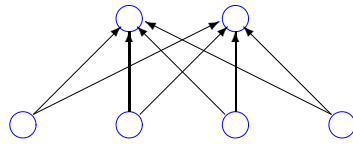
$$W = \begin{vmatrix} 0.6 & 0.2 & 0.8 & 1 \\ 0.5 & 0.7 & 1 & 0.7 \end{vmatrix}$$

9.2



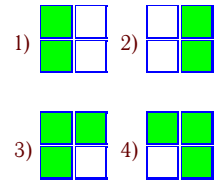
**Задача 9.12**

$\eta = 0.5$



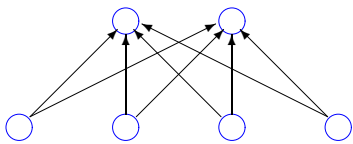
$$W = \begin{vmatrix} 0.8 & 0.8 & 0.9 & 1 \\ 0.9 & 0.9 & 0.1 & 0.9 \end{vmatrix}$$

9.2



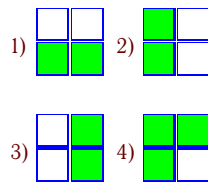
**Задача 9.13**

$\eta = 0.6$



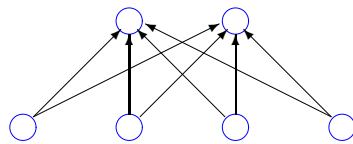
$$W = \begin{vmatrix} 0.5 & 0.2 & 0.5 & 0.7 \\ 0.3 & 0.9 & 0.5 & 0.6 \end{vmatrix}$$

9.2



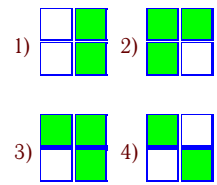
**Задача 9.14**

$\eta = 0.5$



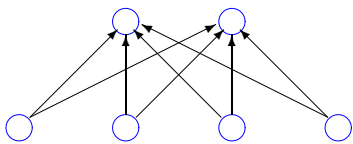
$$W = \begin{vmatrix} 1 & 0.9 & 0.3 & 0.8 \\ 0.1 & 0.9 & 1 & 1.1 \end{vmatrix}$$

9.2



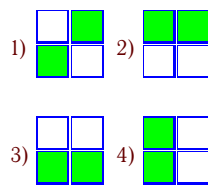
**Задача 9.15**

$\eta = 0.5$



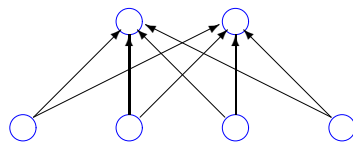
$$W = \begin{vmatrix} 0.2 & 0.5 & 0.6 & 0.1 \\ 0.1 & 0.1 & 0.6 & 0.3 \end{vmatrix}$$

9.2



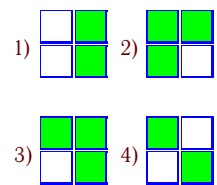
**Задача 9.16**

$\eta = 0.5$



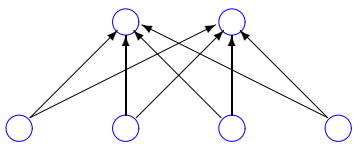
$$W = \begin{vmatrix} 0.9 & 0.7 & 0.8 & 0.7 \\ 0.5 & 0.7 & 1 & 1 \end{vmatrix}$$

9.2



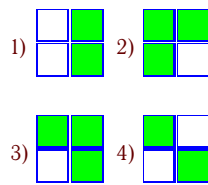
**Задача 9.17**

$\eta = 0.5$



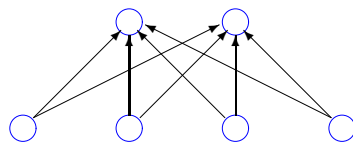
$$W = \begin{vmatrix} 1 & 0.9 & 0.1 & 0.7 \\ 0.8 & 0.3 & 0.2 & 1.1 \end{vmatrix}$$

9.2



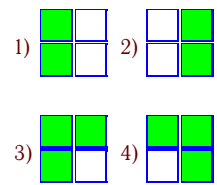
**Задача 9.18**

$\eta = 0.5$



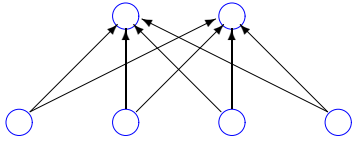
$$W = \begin{vmatrix} 0.8 & 0.6 & 0.7 & 0.9 \\ 0.8 & 0.7 & 0.7 & 0.9 \end{vmatrix}$$

9.2



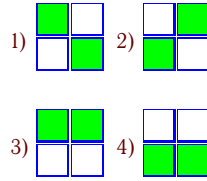
**Задача 9.19**

$\eta = 0.6$



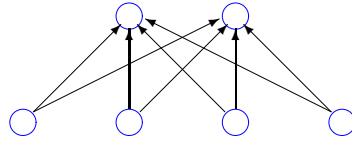
$$W = \begin{vmatrix} 0 & 0.2 & 0.8 & 0.9 \\ 0.1 & 0.7 & 0.2 & 0.1 \end{vmatrix}$$

9.2



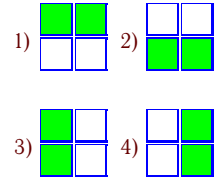
**Задача 9.20**

$\eta = 0.6$



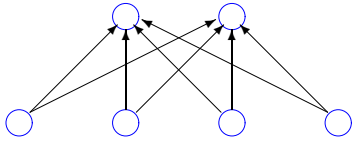
$$W = \begin{vmatrix} 0.4 & 0.2 & 0.6 & 0.3 \\ 0.8 & 0.7 & 1 & 0.5 \end{vmatrix}$$

9.2



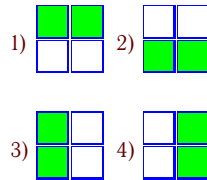
**Задача 9.21**

$\eta = 0.5$



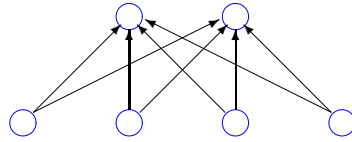
$$W = \begin{vmatrix} 0.3 & 1 & 0.5 & 0.9 \\ 0.7 & 0.4 & 0.2 & 0.4 \end{vmatrix}$$

9.2



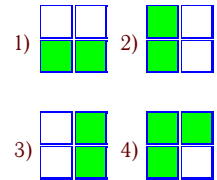
**Задача 9.22**

$\eta = 0.5$



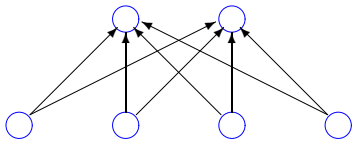
$$W = \begin{vmatrix} 0.5 & 0.9 & 0.5 & 0.8 \\ 0.7 & 0.5 & 0.1 & 0.6 \end{vmatrix}$$

9.2



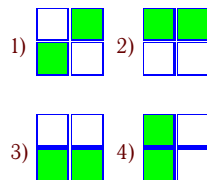
**Задача 9.23**

$\eta = 0.5$



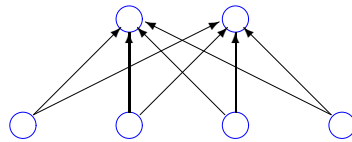
$$W = \begin{vmatrix} 0.2 & 0.8 & 0.2 & 0.1 \\ 0.8 & 0.3 & 0.8 & 0.3 \end{vmatrix}$$

9.2



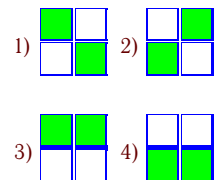
**Задача 9.24**

$\eta = 0.5$



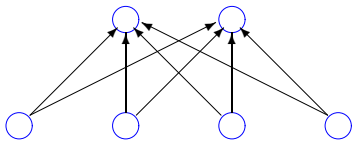
$$W = \begin{vmatrix} 0 & 1 & 0.6 & 0.8 \\ 0.5 & 0.3 & 0.8 & 0.1 \end{vmatrix}$$

9.2



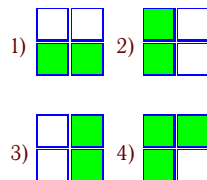
**Задача 9.25**

$\eta = 0.7$



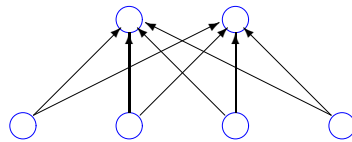
$$W = \begin{vmatrix} 0.5 & 0.3 & 0.5 & 0.4 \\ 0.2 & 0.2 & 0.2 & 0.6 \end{vmatrix}$$

9.2



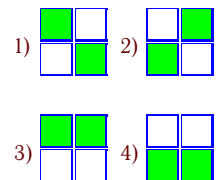
**Задача 9.26**

$\eta = 0.7$



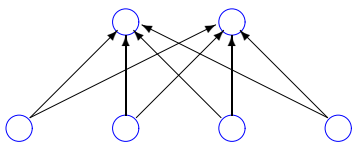
$$W = \begin{vmatrix} 0 & 0.3 & 0.2 & 0.9 \\ 0.5 & 0.5 & 0.5 & 0.1 \end{vmatrix}$$

9.2



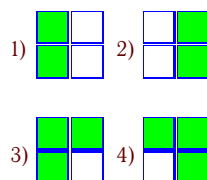
**Задача 9.27**

$\eta = 0.8$



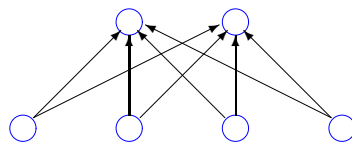
$$W = \begin{vmatrix} 0.8 & 0.4 & 1 & 1 \\ 0.3 & 0.9 & 0.3 & 0.9 \end{vmatrix}$$

9.2



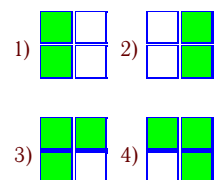
**Задача 9.28**

$\eta = 0.5$



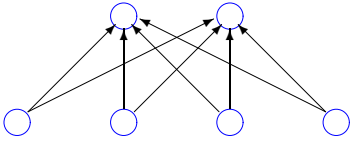
$$W = \begin{vmatrix} 0.8 & 0.8 & 0.4 & 0.3 \\ 0.6 & 0.4 & 0.2 & 0.9 \end{vmatrix}$$

9.2



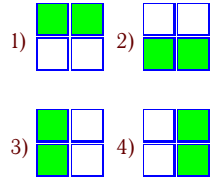
**Задача 9.29**

$\eta = 0.5$



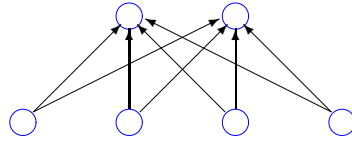
$$W = \begin{vmatrix} 0.4 & 0.5 & 0.6 & 0.7 \\ 0.3 & 0.9 & 0.1 & 0.5 \end{vmatrix}$$

9.2



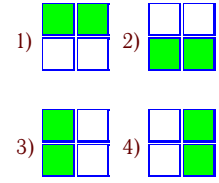
**Задача 9.30**

$\eta = 0.4$



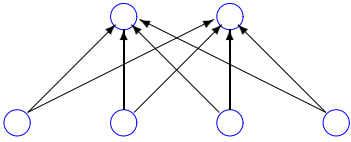
$$W = \begin{vmatrix} 0.3 & 0.1 & 0.1 & 0.5 \\ 0.2 & 0.1 & 0.3 & 0.4 \end{vmatrix}$$

9.2



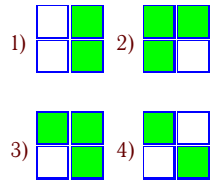
**Задача 9.31**

$\eta = 0.5$



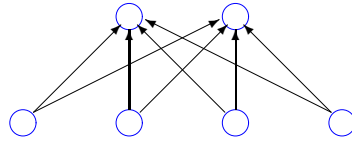
$$W = \begin{vmatrix} 0.9 & 1 & 0.9 & 0.1 \\ 0.2 & 1 & 0.1 & 1 \end{vmatrix}$$

9.2



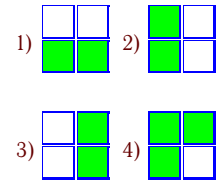
**Задача 9.32**

$\eta = 0.5$



$$W = \begin{vmatrix} 0.5 & 1 & 1 & 0.8 \\ 0.9 & 0.9 & 0.4 & 0.6 \end{vmatrix}$$

9.2



**Сеть Кохонена**

№	W								
1	1, 2, 1, 2	0.025	0.450	0.950	0.650	0.850	0.400	0.600	0.050
2	1, 2, 1, 2	0.025	0.400	0.875	0.525	0.775	0.375	0.625	0.050
3	2, 2, 1, 2	0.250	0.800	0.050	0.800	0.825	0.550	0.900	0.200
4	2, 1, 2, 1	0.048	0.632	0.400	0.920	0.888	0.304	0.712	0.064
5	2, 1, 2, 1	0.144	0.436	0.348	0.928	0.748	0.600	0.724	0.180
6	2, 2, 1, 2	0.100	0.450	0.950	1.000	0.838	0.475	0.725	0.038
7	1, 2, 2, 1	0.350	0.875	0.125	0.650	0.625	0.175	0.975	0.375
8	2, 1, 2, 1	0.027	0.727	0.273	1.000	0.919	0.228	0.718	0.036
9	2, 1, 2, 1	0.964	0.727	0.928	0.036	0.027	0.781	0.273	0.973
10	2, 1, 2, 1	0.075	0.700	0.325	0.925	0.900	0.500	0.600	0.100
11	1, 2, 1, 2	0.096	0.632	0.368	1.000	0.920	0.712	1.000	0.112
12	1, 2, 1, 2	0.950	0.700	0.975	0.250	0.725	0.975	0.025	0.975
13	1, 1, 2, 1	0.872	0.613	0.968	0.141	0.120	0.960	0.200	0.840
14	2, 1, 1, 1	1.000	0.488	0.163	0.850	0.050	0.950	0.500	1.050
15	1, 1, 2, 1	0.775	0.438	0.700	0.013	0.050	0.050	0.800	0.650
16	2, 1, 2, 2	0.950	0.850	0.900	0.350	0.813	0.463	0.125	1.000
17	1, 1, 2, 2	0.750	0.975	0.525	0.425	0.950	0.325	0.050	1.025
18	1, 2, 1, 2	0.950	0.650	0.925	0.225	0.700	0.925	0.175	0.975
19	1, 2, 2, 1	0.240	0.032	0.728	0.984	0.616	0.952	0.272	0.016
20	2, 1, 2, 1	0.064	0.632	0.336	0.888	0.968	0.352	0.760	0.080
21	2, 1, 2, 1	0.075	0.750	0.375	0.975	0.925	0.350	0.550	0.100
22	1, 2, 1, 2	0.125	0.725	0.375	0.950	0.925	0.625	0.775	0.150
23	1, 1, 2, 2	0.550	0.950	0.300	0.025	0.700	0.075	0.950	0.325
24	2, 1, 2, 1	0.000	0.500	0.900	0.700	0.875	0.575	0.200	0.275
25	2, 1, 2, 1	0.955	0.727	0.955	0.036	0.018	0.718	0.228	0.964
26	1, 2, 2, 1	0.210	0.027	0.718	0.991	0.745	0.955	0.255	0.009
27	1, 2, 1, 2	0.992	0.816	1.000	0.040	0.812	0.996	0.012	0.996
28	1, 2, 1, 2	0.950	0.700	0.850	0.075	0.650	0.850	0.050	0.975
29	2, 1, 1, 2	0.600	0.125	0.900	0.425	0.325	0.975	0.025	0.625
30	1, 2, 1, 2	0.748	0.276	0.436	0.180	0.072	0.436	0.348	0.784
31	2, 1, 2, 2	0.950	1.000	0.950	0.050	0.775	0.500	0.013	1.000
32	1, 2, 1, 2	0.125	0.750	0.500	0.950	0.975	0.725	0.850	0.150