Annex A. Results of spectrum sensors based on different SOM structures offline experiments.

Neural Network

Table 1. Neural network training durations for narrow-band signals

1. lentelė. Neuroninio tinklo mokymo trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	14000	12500	43250	30125	43250
16	15500	13875	64000	19000	124750
20	23750	42500	32875	52125	52250
25	28875	37000	13125	30375	123375
30	20625	40250	14000	93750	33250
36	47500	65000	62500	102500	14750
40	48000	59875	65125	45500	102500
45	48250	31625	45500	66500	52125

Table 2. Neural network training durations for burst signals

2. lentelė. Neuroninio tinklo mokymo trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	24125	9500	14000	12750	23250
16	32750	15000	13250	37375	14750
20	13375	14750	33250	30000	14625
25	11250	13375	19625	15000	13125
30	14250	13125	64500	14125	15000
36	39875	22250	15250	49875	15875
40	40750	12750	40625	52125	14375
45	56875	15500	65750	38750	25125

Table 3. Neural network training durations for wide-band signals

3. lentelė. Neuroninio tinklo mokymo trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	118900	178350	134850	169650	98600
16	274775	369025	172550	190675	144275
20	100775	276950	360325	110925	134125
25	145000	294350	384975	203725	104400
30	440075	167475	281300	168925	283475
36	452400	154425	298700	249400	282025
40	406725	329875	192125	376275	334950
45	362500	462550	406000	224025	331325

Table 4. Neural network training durations for frequency hopping signals
4. lentelė. Neuroninio tinklo mokymo trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	32300	32300	116025	59075	73525
16	36975	73525	290275	147050	105400
20	142800	73100	212500	102850	96475
25	106250	114325	164900	231625	87550
30	157675	187850	212500	218025	189125
36	152575	136425	418200	150025	148325
40	180625	62050	257125	342550	288150
45	193375	199325	212500	340000	259250

Table 5. Neural network detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals
5. lentelė. Neuroninio tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.998	0.041	0.972	0.042	0.951	0.041	0.951	0.04	1	0.04
16	0.998	0.042	0.952	0.043	0.984	0.04	0.984	0.04	0.997	0.023
20	1	0.03	0.954	0.043	0.963	0.039	0.963	0.003	0.994	0.023
25	0.995	0.042	0.995	0.043	0.926	0.026	0.925	0.039	0.995	0.028
30	0.98	0.017	0.997	0.042	0.973	0.026	0.967	0.02	0.997	0.039
36	0.993	0.042	0.99	0.042	0.97	0.04	0.97	0.005	0.843	0
40	0.998	0.042	0.976	0.042	0.9	0.036	0.899	0	0.992	0.017
45	0.998	0.036	0.954	0.043	0.985	0.023	0.985	0.003	0.988	0.039

Table 6. Neural network detection – P_D and false alarm – P_{Fa} ratios for burst signals
6. lentelė. Neuroninio tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.05	0.924	0.05	0.992	0.028	0.995	0.022	1	0.078
16	1	0.05	0.969	0.04	0.961	0.018	1	0.024	0.981	0.055
20	0.96	0.026	0.995	0.05	0.99	0.013	1	0.045	0.975	0.047
25	0.996	0.037	0.992	0.05	0.99	0.028	1	0.035	0.969	0.04
30	0.992	0.013	0.994	0.03	0.993	0.018	0.991	0.014	0.952	0.054
36	0.995	0.041	0.994	0.01	0.981	0.026	1	0.039	0.994	0.05
40	0.997	0.05	0.969	0.045	0.963	0.022	1	0.015	0.971	0.04
45	0.991	0.04	0.987	0.049	0.989	0.05	0.993	0.024	0.961	0.037

Table 7. Neural network detection – P_D and false alarm – P_{Fa} ratios for wide-band signals
7. lentelė. Neuroninio tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.998	0.013	1	0.013	1	0.018	1	0.03	0.994	0.032
16	1	0.012	1	0.017	1	0.016	0.999	0.031	0.989	0.015
20	0.999	0.002	1	0.018	1	0.021	1	0.017	0.991	0.019
25	0.999	0.017	0.998	0.013	0.998	0.005	1	0.009	0.99	0.013
30	0.999	0.003	1	0.008	1	0.009	1	0.011	0.995	0.012
36	0.999	0.002	0.998	0.018	1	0.007	0.995	0.016	0.995	0.012
40	1	0.003	0.993	0.016	1	0.007	1	0.01	0.987	0.014
45	0.995	0.012	1	0.005	1	0.016	1	0.011	0.994	0.013

Table 8. Neural network detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals
8. lentelė. Neuroninio tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.985	0.011	0.984	0.011	0.989	0.024	0.985	0.019	0.969	0.01
16	0.97	0.023	0.982	0.012	0.967	0.007	0.979	0.006	0.976	0.008
20	0.977	0.02	0.989	0.092	0.985	0.056	0.983	0.007	0.989	0.007
25	0.981	0.026	0.967	0.034	1	0.095	0.99	0.017	0.978	0.01
30	0.976	0.017	0.939	0.018	1	0.099	0.989	0.016	0.991	0.027
36	0.976	0.022	0.99	0.05	0.98	0.032	0.99	0.087	0.938	0.005
40	0.977	0.02	0.99	0.015	0.942	0	1	0.077	0.965	0.008
45	0.977	0.029	0.987	0.013	1	0.053	0.971	0.018	0.974	0.009

General rule based SOM with Square neighborhood.

Table 9. Square SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals
9. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.925	0	1	0.015	0.985	0.006	0.989	0.024	0.999	0.008
16	0.97	0	1	0.026	1	0.007	0.999	0.019	1	0.008
20	0.998	0	1	0.066	1	0.014	1	0.027	0.998	0.008
25	1	0.018	1	0.024	0.994	0.003	1	0.009	0.999	0.005
30	1	0.003	1	0.041	0.981	0.002	0.999	0.005	1	0.014
36	1	0.07	1	0.004	1	0.014	1	0.002	1	0.013
40	1	0.042	1	0.011	0.991	0.009	1	0.006	1	0.018
45	1	0.058	1	0.01	0.99	0.002	0.996	0.006	0.968	0.011

Table 10. Square SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

10. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.051	1	0.076	1	0.019	0.838	0.055	1	0.028
16	1	0.025	1	0.032	1	0.02	1	0.029	1	0.036
20	1	0.038	1	0.029	1	0.02	1	0.03	1	0.019
25	1	0.054	1	0.059	1	0.023	1	0.011	1	0.028
30	1	0.021	1	0.019	1	0.027	1	0.025	1	0.013
36	1	0.023	1	0.021	1	0.074	1	0.015	1	0.022
40	1	0.025	1	0.018	1	0.012	1	0.014	1	0.022
45	1	0.019	1	0.011	1	0.017	1	0.017	1	0.02

Table 11. Square SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

11. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.013	0.965	0.005	0.982	0.001	0.892	0	0.926	0.008
16	1	0.014	0.985	0.006	0.998	0.002	0.914	0	0.932	0.009
20	1	0.013	0.992	0.007	1	0.005	0.954	0	0.927	0.008
25	1	0.009	0.996	0.007	0.98	0	0.987	0	0.951	0.001
30	0.986	0.005	1	0.013	1	0.012	1	0.007	0.988	0.004
36	1	0.01	1	0.007	0.998	0.004	1	0.01	0.986	0.01
40	1	0.009	1	0.01	0.996	0.006	0.968	0	0.956	0.012
45	1	0.007	1	0.01	1	0.008	0.884	0	0.923	0.008

Table 12. Square SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

12. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.983	0.018	0.913	0	0.963	0.009	0.865	0	0.882	0.005
16	0.961	0.022	1	0.012	0.925	0	0.857	0	0.874	0.001
20	0.988	0.015	1	0.015	0.987	0.021	0.978	0.01	0.905	0
25	0.969	0.011	0.983	0.013	0.949	0.007	0.965	0.012	0.954	0.008
30	0.983	0.014	1	0.016	1	0.011	0.973	0.008	0.988	0.009
36	0.986	0.016	0.966	0.014	0.978	0.008	0.979	0.006	1	0.011
40	0.983	0.019	1	0.01	0.999	0.018	0.985	0.008	0.987	0.018
45	0.984	0.013	0.997	0.011	1	0.027	0.991	0.01	0.981	0.009

General rule based SOM with Rhombus neighborhood.

Table 13. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

13. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.012	1	0.014	0.868	0	1	0.017	1	0.024
16	1	0.015	1	0.011	0.89	0	1	0.018	1	0.028
20	1	0.018	1	0.009	0.986	0.015	1	0.016	0.999	0.021
25	1	0.012	1	0.017	0.997	0.014	1	0.011	1	0.028
30	1	0.013	1	0.01	1	0.019	1	0.012	1	0.029
36	1	0.009	1	0.008	1	0.01	1	0.009	1	0.019
40	1	0.01	1	0.012	0.983	0.006	1	0.01	1	0.022
45	1	0.011	1	0.02	0.989	0.005	1	0.012	0.999	0.016

Table 14. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

14. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.031	1	0.028	1	0.03	1	0.028	1	0.025
16	1	0.032	1	0.026	1	0.015	1	0.024	1	0.024
20	1	0.022	1	0.023	1	0.017	1	0.031	1	0.036
25	1	0.023	1	0.023	1	0.027	1	0.019	1	0.019
30	1	0.014	1	0.018	1	0.027	1	0.018	1	0.029
36	1	0.022	1	0.016	1	0.017	1	0.016	1	0.026
40	1	0.014	1	0.014	1	0.017	1	0.022	1	0.029
45	1	0.026	1	0.018	1	0.03	1	0.02	1	0.028

Table 15. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

15. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.979	0	0.993	0.007	0.999	0.002	0.991	0.012	0.968	0
16	1	0.007	1	0.014	0.996	0.002	1	0.011	0.937	0
20	0.999	0.011	0.995	0.006	0.975	0	1	0.031	0.904	0
25	1	0.022	1	0.018	1	0.009	1	0.01	0.904	0
30	1	0.013	1	0.008	1	0.013	1	0.01	0.916	0
36	1	0.009	1	0.009	0.965	0.003	1	0.011	0.986	0
40	1	0.004	1	0.012	1	0.007	0.987	0.01	0.992	0.002
45	1	0.01	1	0.015	0.99	0.007	1	0.011	0.978	0

Table 16. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

16. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.771	0	1	0.063	0.932	0.012	1	0.02	0.737	0.003
16	1	0.032	1	0.012	0.997	0.033	1	0.023	0.957	0.005
20	0.957	0	1	0.013	1	0.029	1	0.031	0.932	0.004
25	1	0.017	1	0.012	1	0.018	1	0.049	0.991	0.013
30	1	0.016	1	0.012	1	0.017	1	0.023	0.971	0.009
36	0.761	0	1	0.024	1	0.013	1	0.016	0.981	0.013
40	1	0.018	1	0.02	1	0.015	1	0.016	0.971	0.011
45	0.833	0	1	0.028	1	0.019	1	0.025	0.958	0.014

General rule based SOM with Hexagonal neighborhood.

Table 17. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

17. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.018	1	0.017	0.595	0	1	0.015	0.999	0.077
16	1	0.012	1	0.013	0.996	0.014	1	0.013	0.998	0.062
20	1	0.02	1	0.009	0.648	0	1	0.008	1	0.018
25	1	0.01	1	0.014	1	0.009	1	0.012	1	0.02
30	1	0.015	1	0.011	1	0.013	1	0.018	1	0.018
36	1	0.013	1	0.009	0.907	0.005	1	0.016	1	0.015
40	1	0.017	1	0.019	0.999	0.013	1	0.009	1	0.014
45	1	0.014	1	0.016	0.944	0.005	1	0.014	1	0.011

Table 18. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

18. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.052	1	0.027	0.386	0	1	0.029	1	0.024
16	1	0.031	1	0.013	1	0.027	1	0.018	1	0.06
20	1	0.032	1	0.027	1	0.02	1	0.021	1	0.035
25	1	0.033	1	0.018	1	0.017	1	0.019	1	0.026
30	1	0.023	1	0.015	1	0.027	1	0.029	1	0.041
36	1	0.023	1	0.015	1	0.027	1	0.025	1	0.027
40	1	0.019	1	0.019	1	0.027	1	0.02	1	0.029
45	1	0.02	1	0.018	1	0.027	1	0.019	1	0.024

Table 19. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

19. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.986	0	1	0.011	0.996	0	0.903	0	0.893	0
16	0.977	0	1	0.01	1	0.009	0.952	0	0.923	0
20	1	0.012	0.985	0.008	1	0.015	1	0.003	0.885	0
25	0.981	0	1	0.006	1	0.007	1	0.005	0.96	0
30	1	0.011	1	0.013	0.994	0.002	1	0.002	0.941	0
36	1	0.01	1	0.014	0.996	0.002	0.99	0.001	0.917	0
40	1	0.01	1	0.01	1	0.014	0.969	0	0.989	0
45	0.988	0.001	1	0.004	0.984	0.016	0.989	0.014	0.88	0

Table 20. Hexagonal SOM detection– P_D and false alarm – P_{Fa} ratios for frequency hopping signals

20. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.187	0.812	0	0.992	0.013	0.898	0	0.891	0.006
16	0.886	0	0.874	0	1	0.012	0.894	0.007	0.871	0
20	1	0.019	0.886	0	1	0.018	0.813	0	0.833	0.004
25	0.855	0	0.866	0	1	0.023	0.997	0.015	0.894	0.003
30	0.946	0	1	0.019	1	0.021	1	0.023	0.994	0.013
36	0.726	0	0.951	0.02	1	0.017	0.976	0.016	0.883	0.006
40	1	0.014	1	0.015	1	0.024	0.967	0.008	0.937	0.022
45	1	0.02	1	0.02	1	0.026	0.946	0.004	0.987	0.02

SOM self-training with endpoint detection (Square neighborhood).

Table 21. Square SOM self-training durations for narrow-band signals

21. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	2155	3072	802	512	1545
16	1847	6819	1694	1569	1814
20	1065	3258	1123	2544	1185
25	4856	7721	2540	3625	1456
30	1916	3079	8491	1254	4987
36	1789	4453	1839	3612	1292
40	1482	2589	9258	4258	1523
45	3658	4598	5127	3654	4544

Table 22. Square SOM self-training durations for burst signals

22. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	821	1253	1476	546	1362
16	2893	2610	1414	6160	1321
20	1401	1541	2561	3520	2924
25	2915	2369	3625	1125	2582
30	1894	1593	1302	1478	1342
36	3741	4138	2020	5358	1108
40	1273	2552	1698	1001	3320
45	5463	4172	2299	2548	3001

Table 23. Square SOM self-training durations for wide-band signals

23. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1152	4500	4500	2299	4500
16	956	7821	8000	8000	8000
20	3285	3021	10000	12500	11250
25	3254	4863	12500	3654	5698
30	4788	10100	4532	6819	9732
36	1052	11051	7221	4796	6654
40	10545	3011	5752	4732	14254
45	6314	16412	6523	10521	4510

Table 24. Square SOM self-training for frequency hopping signals

24. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1220	1915	1055	4500	4500
16	1290	1718	1812	8000	8000
20	1632	2242	1296	12500	2170
25	1505	1669	2568	5201	8114
30	1427	2296	1846	4102	3856
36	1379	1649	1501	8813	2736
40	2404	1625	1748	9661	11700
45	3259	2427	2324	5816	4099

Table 25. Square SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

25. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.021	1	0.016	0.883	0	1	0.02	0.968	0.014
16	1	0.014	1	0.017	0.963	0.006	1	0.014	1	0.018
20	1	0.011	1	0.009	0.938	0.003	1	0.011	1	0.021
25	1	0.01	1	0.013	1	0.099	1	0.01	1	0.028
30	1	0.018	1	0.011	1	0.012	1	0.041	1	0.023
36	1	0.016	1	0.014	1	0.012	1	0.02	1	0.022
40	1	0.009	1	0.017	0.989	0.012	1	0.012	1	0.015
45	1	0.018	1	0.013	0.996	0.014	1	0.024	1	0.022

Table 26. Square SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

26. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.951	0.011	1	0.02	0.79	0	1	0.03	1	0.021
16	0.985	0.02	1	0.014	1	0.017	1	0.024	1	0.015
20	0.954	0.015	1	0.017	1	0.027	1	0.028	1	0.024
25	0.98	0.019	1	0.025	1	0.02	1	0.029	1	0.03
30	0.966	0.017	1	0.026	1	0.027	1	0.019	1	0.017
36	0.986	0.018	1	0.023	1	0.017	1	0.012	1	0.026
40	0.978	0.011	1	0.015	1	0.017	0.957	0.01	1	0.028
45	0.986	0.009	1	0.021	1	0.047	1	0.019	1	0.026

Table 27. Square SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

27. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.989	0.002	0.968	0.005	0.984	0	1	0.014	0.89	0
16	0.969	0	0.993	0.008	1	0.005	1	0.01	0.898	0
20	0.982	0	0.984	0.006	0.997	0.009	1	0.01	0.944	0
25	1	0.016	0.993	0.008	0.997	0.002	1	0.01	0.95	0
30	1	0.015	1	0.012	1	0.004	0.979	0.006	0.969	0
36	1	0.011	1	0.013	0.989	0.001	1	0.011	0.957	0
40	1	0.01	1	0.008	1	0.015	0.988	0.006	0.987	0
45	0.996	0.003	1	0.009	1	0.01	0.999	0.007	0.932	0

Table 28. Square SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

28. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.902	0	0.943	0	1	0.013	0.953	0.009	0.942	0.009
16	0.961	0	1	0.026	1	0.029	1	0.033	0.943	0.005
20	1	0.032	1	0.017	1	0.022	1	0.031	0.978	0.041
25	1	0.026	1	0.03	1	0.024	1	0.062	0.939	0.017
30	1	0.031	1	0.025	1	0.027	0.972	0.003	0.999	0.034
36	1	0.022	0.98	0	1	0.028	1	0.019	0.998	0.025
40	1	0.016	1	0.013	1	0.026	1	0.019	0.983	0.021
45	1	0.027	0.978	0	1	0.024	1	0.024	0.975	0.025

SOM self-training with endpoint detection (Rhombus neighborhood).

Table 29. Rhombus SOM self-training durations for narrow-band signals

29. lentelė. Rombo Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	4500	1835	1445	1323
16	8000	8000	1590	1351	1408
20	2863	2394	1617	1007	3462
25	3003	2569	1390	1404	1261
30	7552	1283	4201	2216	1619
36	2734	18000	1448	1202	3446
40	1447	2820	2337	2946	1601
45	5443	3803	2741	1318	1849

Table 30. Rhombus SOM self-training durations for burst signals

30. lentelė. Rombo Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1052	1409	1280	1281	1219
16	3010	1353	1226	1317	1535
20	2232	2567	1262	1219	1013
25	1354	1400	1382	1493	1585
30	1234	1403	1242	1370	1406
36	1555	3433	1266	1261	1815
40	2575	1412	1307	1386	1833
45	4556	2375	1517	1269	1233

Table 31. Rhombus SOM self-training durations for wide-band signals

31. lentelė. Rombo Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1066	4500	4500	4500	4500
16	8000	1561	8000	8000	8000
20	10000	10000	5697	1206	12500
25	2597	4664	3664	2278	9142
30	9786	3700	10010	6457	3645
36	11124	12466	4536	12400	15420
40	18113	8791	2210	1118	11124
45	12839	3874	2037	3691	14849

Table 32. Rhombus SOM self-training for frequency hopping signals

32. lentelė. Rombo Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1295	2284	4076	4500	2463
16	1324	1469	1657	4357	5415
20	1454	2520	2340	1024	4302
25	1373	3404	1958	1275	1420
30	1258	2325	1498	1704	1616
36	1115	1059	8181	7451	6477
40	1339	560	1548	9962	1643
45	2262	1888	2308	6662	2378

Table 33. Rhombu SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

33. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.022	1	0.01	0.794	0	1	0.014	1	0.041
16	1	0.029	1	0.019	1	0.017	1	0.019	1	0.033
20	1	0.019	1	0.01	1	0.019	1	0.015	1	0.021
25	1	0.017	1	0.01	1	0.014	1	0.011	1	0.025
30	1	0.009	1	0.014	0.974	0.007	1	0.017	1	0.038
36	1	0.014	1	0.017	0.975	0.01	1	0.016	1	0.063
40	1	0.013	1	0.006	0.981	0.009	1	0.025	1	0.015
45	1	0.017	1	0.006	0.96	0.007	1	0.008	1	0.016

Table 34. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

34. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.038	1	0.036	0.96	0.006	1	0.024	1	0.057
16	1	0.036	1	0.03	0.961	0.009	1	0.027	1	0.052
20	1	0.039	1	0.025	1	0.027	1	0.037	1	0.047
25	1	0.039	1	0.04	1	0.037	1	0.028	1	0.05
30	1	0.039	1	0.037	1	0.074	1	0.035	1	0.057
36	1	0.041	1	0.04	1	0.027	1	0.026	1	0.048
40	1	0.036	1	0.024	1	0.023	1	0.036	1	0.047
45	1	0.031	1	0.031	1	0.032	1	0.032	1	0.047

Table 35. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

35. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.979	0	0.995	0.005	1	0.006	0.963	0.01	0.916	0.008
16	1	0.002	1	0.008	1	0.004	1	0.002	0.94	0.01
20	1	0.014	1	0.019	1	0.003	0.955	0	0.96	0.002
25	1	0.014	1	0.016	1	0.008	1	0.001	0.919	0.008
30	1	0.012	1	0.013	1	0.012	1	0.011	0.995	0.024
36	1	0.019	1	0.012	1	0.019	1	0.002	0.993	0.023
40	1	0.016	1	0.008	1	0.01	1	0.008	0.993	0.012
45	1	0.015	1	0.003	1	0.013	1	0.003	0.92	0.008

Table 36. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

36. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.017	1	0.022	0.958	0	0.975	0	0.863	0
16	1	0.016	1	0.014	1	0.022	1	0.026	0.961	0.013
20	0.98	0	1	0.01	0.992	0.008	1	0.021	0.98	0.016
25	1	0.02	1	0.023	1	0.015	0.892	0	1	0.031
30	1	0.017	1	0.022	1	0.017	1	0.021	0.998	0.023
36	1	0.018	1	0.019	1	0.023	1	0.018	0.992	0.026
40	1	0.024	1	0.02	1	0.022	0.99	0.022	0.999	0.023
45	1	0.017	1	0.024	1	0.023	1	0.022	0.995	0.038

SOM self-training with endpoint detection (Hexagonal neighborhood).

Table 37. Hexagonal SOM self-training durations for narrow-band signals

37. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1215	4500	814	1119	1673
16	1091	7967	2897	1378	1217
20	1017	3384	1197	1427	1346
25	1980	1306	1478	1983	1259
30	4138	706	671	2298	1473
36	1959	639	1135	5884	537
40	1354	3581	1022	1432	2072
45	720	1661	1510	6079	1642

Table 38. Hexagonal SOM self-training durations for burst signals

38. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	2512	1655	3251	1588	1729
16	6523	1267	3557	1941	1857
20	1665	3424	1387	1442	1560
25	1404	1257	1508	1631	1387
30	2017	1060	1315	1534	1281
36	8841	1529	4672	1136	1220
40	1446	15206	1768	1418	1595
45	1666	1631	1875	1529	2199

Table 39. Hexagonal SOM self-training durations for wide-band signals

39. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	4500	4500	4500	4500
16	1034	2061	8000	8000	8000
20	6221	10251	1851	10000	10000
25	5812	10577	9310	9552	12500
30	3156	1728	11102	3781	15000
36	9831	1616	4565	4298	6285
40	14030	20000	12941	1111	9325
45	12145	13513	16188	9641	11007

Table 40. Hexagonal SOM self-training for frequency hopping signals

40. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	1143	2443	814	4500	4500
16	1286	2468	2897	1435	8000
20	1717	1975	1197	6257	2442
25	1285	2507	1578	4412	2628
30	1008	1308	1671	906	1755
36	1968	1604	1135	8800	1561
40	1351	2524	1022	1213	2433
45	2457	2276	510	6008	2312

Table 41. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

41. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.018	1	0.017	0.964	0.008	1	0.012	1	0.051
16	1	0.012	1	0.011	0.957	0	1	0.01	1	0.019
20	1	0.014	1	0.008	0.986	0.006	1	0.017	1	0.042
25	1	0.017	1	0.009	0.993	0.014	1	0.016	1	0.024
30	1	0.012	1	0.014	0.996	0.017	1	0.019	1	0.011
36	1	0.008	1	0.012	0.955	0.004	1	0.016	1	0.029
40	1	0.008	1	0.019	0.99	0.005	1	0.014	1	0.022
45	1	0.019	1	0.011	0.935	0.007	1	0.016	1	0.023

Table 42. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

42. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.025	1	0.043	1	0.043	1	0.03	1	0.038
16	1	0.014	1	0.013	0.907	0.008	1	0.029	1	0.041
20	1	0.047	1	0.031	1	0.027	1	0.033	1	0.046
25	1	0.049	1	0.042	1	0.037	1	0.039	1	0.044
30	1	0.041	1	0.045	1	0.033	1	0.026	1	0.036
36	1	0.049	1	0.046	1	0.046	1	0.025	1	0.033
40	1	0.024	1	0.049	1	0.022	1	0.025	1	0.046
45	1	0.035	1	0.059	1	0.069	1	0.025	1	0.035

Table 43. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

43. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.997	0.003	0.988	0.006	0.975	0	0.977	0	1	0.023
16	0.998	0.01	0.989	0.008	1	0.004	0.898	0	1	0.018
20	1	0.008	1	0.009	0.995	0	0.922	0	1	0.01
25	1	0.012	1	0.013	0.997	0	0.97	0	1	0.016
30	1	0.01	1	0.009	1	0.012	0.989	0.001	0.98	0
36	0.991	0.001	1	0.007	1	0.014	1	0.011	1	0.012
40	1	0.01	1	0.017	1	0.013	1	0.01	0.992	0.009
45	0.998	0.003	1	0.01	1	0.007	0.914	0	1	0.01

Table 44. Hexagonal SOM detection– P_D and false alarm – P_{Fa} ratios for frequency hopping signals

44. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.021	1	0.006	1	0.013	0.928	0	0.955	0.005
16	1	0.022	1	0.019	1	0.017	1	0.019	0.986	0.02
20	1	0.014	1	0.017	1	0.012	0.997	0.013	0.989	0.014
25	1	0.017	1	0.023	1	0.021	0.963	0	0.977	0.017
30	1	0.015	1	0.025	1	0.021	1	0.03	0.997	0.018
36	1	0.017	1	0.023	1	0.018	1	0.016	0.99	0.02
40	1	0.029	1	0.015	1	0.009	1	0.02	0.961	0.019
45	1	0.015	1	0.024	1	0.048	0.973	0.004	0.98	0.014

SOM self-training with assistant (Square neighborhood).

Table 45. Square SOM self-training durations for narrow-band signals

45. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	2279	1234	2742	2798
16	3334	2078	488	8000	411
20	599	526	528	1210	597
25	962	6744	459	500	2186
30	3550	4792	408	4028	1464
36	2399	3497	420	4052	1524
40	570	771	775	596	1975
45	1146	1928	5019	1546	1143

Table 46. Square SOM self-training durations for burst signals

46. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	422	613	859	554	1341
16	785	1798	789	902	534
20	546	605	528	583	572
25	1029	1079	1159	1118	816
30	4235	678	586	522	525
36	550	8450	565	529	509
40	523	503	520	472	583
45	571	1719	570	588	589

Table 47. Square SOM self-training durations for wide-band signals

47. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	2298	4500	533	4500
16	6112	3942	4441	8000	8000
20	4967	3222	10000	10000	10000
25	2254	4356	6645	6225	12500
30	2123	2042	6479	9561	2215
36	6597	1185	1654	3337	3218
40	2132	7945	13730	20000	20000
45	15629	19284	1039	14569	22500

Table 48. Square SOM self-training for frequency hopping signals

48. lentelė. Stačiakampio Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	547	1630	1124	4500	4500
16	584	788	426	499	3474
20	503	1143	575	2897	2871
25	717	576	474	1825	1163
30	598	529	524	519	5569
36	520	636	3606	3251	423
40	550	503	2708	2168	2134
45	554	598	614	2144	2553

Table 49. Square SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

49. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.015	1	0.018	0.991	0.005	1	0.014	0.999	0.001
16	1	0.008	1	0.009	0.952	0	0.958	0.006	0.982	0.006
20	1	0.01	1	0.008	0.918	0.005	1	0.012	0.949	0.001
25	1	0.017	1	0.014	0.991	0.009	1	0.01	1	0.007
30	1	0.012	1	0.005	0.986	0.009	1	0.017	1	0.012
36	1	0.011	1	0.012	0.968	0.007	1	0.007	1	0.013
40	1	0.011	1	0.015	0.951	0.002	1	0.016	1	0.014
45	1	0.008	1	0.019	0.887	0	0.967	0.009	1	0.014

Table 50. Square SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

50. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.013	1	0.02	0.964	0	1	0.026	1	0.044
16	1	0.024	1	0.018	1	0.017	1	0.028	1	0.053
20	1	0.026	1	0.017	1	0.02	1	0.044	1	0.052
25	1	0.018	1	0.015	1	0.027	1	0.015	1	0.053
30	1	0.019	1	0.025	1	0.027	1	0.012	1	0.046
36	1	0.016	1	0.028	1	0.027	1	0.024	1	0.036
40	1	0.026	1	0.014	1	0.017	1	0.044	1	0.035
45	1	0.023	1	0.023	1	0.024	1	0.035	1	0.028

Table 51. Square SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

51. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.005	0.983	0.006	0.994	0.001	0.966	0	0.93	0
16	0.974	0.001	0.991	0.007	0.983	0	0.988	0	0.938	0
20	1	0.009	0.978	0.006	0.999	0.009	0.955	0	0.979	0.01
25	0.998	0.004	0.998	0.01	1	0.008	0.972	0	0.986	0.01
30	1	0.009	1	0.014	1	0.013	0.992	0.008	0.962	0.003
36	1	0.006	1	0.01	1	0.01	0.991	0.004	0.972	0.004
40	0.998	0.004	1	0.009	1	0.006	0.969	0	0.946	0
45	1	0.016	1	0.01	0.993	0.003	0.948	0	0.966	0

Table 52. Square SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

52. lentelė. Stačiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.012	1	0.019	1	0.021	0.896	0	0.987	0.015
16	1	0.015	1	0.013	1	0.027	0.924	0.005	0.992	0.01
20	1	0.01	0.947	0	1	0.017	0.93	0.002	0.935	0.005
25	1	0.015	1	0.019	1	0.019	0.982	0.001	0.984	0.02
30	1	0.013	1	0.01	0.961	0.006	1	0.008	0.988	0.018
36	1	0.013	1	0.02	1	0.014	0.993	0.003	0.985	0.016
40	0.898	0	1	0.016	1	0.025	0.999	0.014	0.984	0.017
45	1	0.02	1	0.015	1	0.022	0.999	0.019	0.998	0.016

SOM self-training with assistant (Rhombus neighborhood).

Table 53. Rhombus SOM self-training durations for narrow-band signals

53. lentelė. Rombo Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	2528	466	459	4295
16	5472	470	455	593	515
20	646	1550	1997	1642	951
25	2863	4651	673	12500	597
30	1841	991	1308	461	525
36	1772	5702	720	535	537
40	492	4878	553	528	416
45	570	565	577	2080	514

Table 54. Rhombus SOM self-training durations for burst signals

54. lentelė. Rombo Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	903	542	568	1065	890
16	1471	687	559	562	564
20	687	1054	509	557	512
25	947	411	480	458	593
30	1163	577	493	483	579
36	581	3046	532	578	542
40	665	1616	530	596	453
45	1239	607	590	585	1208

Table 55. Rhombus SOM self-training durations for wide-band signals

55. lentelė. Rombo Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	484	1542	4500	4500
16	5325	8000	8000	8000	5442
20	6515	1073	10000	10000	10000
25	3286	606	2156	8541	2516
30	4996	746	3548	5481	15000
36	11200	1147	6954	1284	9538
40	1187	11741	483	715	7812
45	703	3251	3498	1187	8982

Table 56. Rhombus SOM self-training for frequency hopping signals

56. lentelė. Rombo Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	507	490	567	4500	631
16	564	1178	1629	1170	3057
20	858	4257	599	2156	568
25	549	800	531	863	5210
30	526	502	557	4740	536
36	536	471	5202	1810	2478
40	565	566	769	596	954
45	586	527	5298	866	1878

Table 57. Rhombu SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

57. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.015	1	0.013	0.928	0	1	0.009	0.996	0.021
16	1	0.009	1	0.009	0.961	0	1	0.013	1	0.017
20	1	0.013	1	0.015	0.988	0.013	1	0.012	1	0.021
25	1	0.012	1	0.012	0.982	0.007	1	0.017	1	0.033
30	1	0.014	1	0.009	1	0.01	1	0.011	1	0.028
36	1	0.009	1	0.009	0.995	0.015	1	0.016	1	0.024
40	1	0.014	1	0.01	0.999	0.013	1	0.012	1	0.024
45	1	0.011	1	0.012	0.997	0.014	1	0.018	1	0.02

Table 58. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

58. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.023	1	0.027	1	0.017	1	0.024	1	0.044
16	1	0.035	1	0.024	1	0.02	1	0.025	1	0.044
20	1	0.036	1	0.022	1	0.017	1	0.02	1	0.025
25	1	0.022	1	0.017	1	0.034	1	0.02	1	0.024
30	1	0.023	1	0.013	1	0.028	1	0.027	1	0.029
36	1	0.028	1	0.013	1	0.027	1	0.036	1	0.036
40	1	0.026	1	0.029	1	0.044	1	0.033	1	0.045
45	1	0.036	1	0.049	1	0.025	1	0.029	1	0.027

Table 59. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

59. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.992	0.011	1	0.015	0.999	0.003	0.997	0.006	0.985	0
16	1	0.008	0.998	0.004	0.993	0.006	0.95	0.009	0.959	0
20	0.999	0.007	1	0.017	0.996	0.003	0.983	0.008	0.904	0
25	1	0.004	1	0.011	1	0.01	0.986	0.003	0.988	0.001
30	1	0.008	1	0.012	1	0.01	0.965	0.004	0.987	0
36	1	0.011	1	0.005	1	0.013	0.981	0.008	0.968	0
40	1	0.009	1	0.009	1	0.01	0.998	0.007	0.991	0.002
45	1	0.011	1	0.011	1	0.016	0.972	0.005	0.968	0

Table 60. Rhombus SOM detection – P_D and false alarm – P_{Fa} ratios for frequency hopping signals

60. lentelė. Rombo Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.014	1	0.012	1	0.023	0.969	0	0.91	0
16	1	0.016	1	0.014	1	0.012	0.985	0.002	0.964	0.001
20	1	0.013	1	0.008	1	0.013	0.957	0.004	1	0.025
25	1	0.021	1	0.013	1	0.033	0.992	0.009	0.971	0.003
30	1	0.017	1	0.018	1	0.011	0.996	0.008	1	0.03
36	1	0.021	1	0.029	1	0.016	1	0.016	0.998	0.023
40	1	0.013	1	0.026	1	0.012	0.996	0.012	1	0.014
45	1	0.017	1	0.022	1	0.011	0.944	0	0.994	0.011

SOM self-training with assistant (Hexagonal neighborhood).

Table 61. Hexagonal SOM self-training durations for narrow-band signals

61. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	4500	4500	834	794
16	6254	2323	2474	695	508
20	2254	888	1944	4704	741
25	612	1245	1449	438	445
30	537	1107	486	965	1282
36	697	1525	884	447	575
40	479	1255	909	461	474
45	1109	1251	503	536	555

Table 62. Hexagonal SOM self-training durations for burst signals

62. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	451	1254	442	503	1261
16	701	2215	566	476	676
20	1027	1029	510	543	1543
25	431	761	1207	586	2439
30	816	564	528	527	588
36	1000	819	1768	4517	530
40	584	830	2316	455	518
45	546	731	566	817	516

Table 63. Hexagonal SOM self-training durations for wide-band signals

63. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	4500	597	4500	4500	4500
16	8000	3071	850	8000	8000
20	4552	2169	10000	1465	4981
25	2139	7738	12500	7722	5441
30	4239	513	2825	6241	6421
36	10130	15156	2114	3695	743
40	2146	2215	1835	1145	2151
45	849	2115	2674	8178	911

Table 64. Hexagonal SOM self-training for frequency hopping signals

64. lentelė. Šešiakampio Kohonen tinklo mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	756	1080	2394	1033	1452
16	526	545	881	5145	4872
20	415	705	596	994	811
25	467	565	827	1212	3459
30	1082	597	426	642	13779
36	547	587	836	571	4040
40	584	556	411	1583	594
45	568	551	563	564	1552

Table 65. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

65. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.008	1	0.013	0.979	0	1	0.018	1	0.028
16	1	0.008	1	0.018	0.985	0.01	1	0.005	1	0.017
20	1	0.03	1	0.015	0.959	0	1	0.015	1	0.023
25	1	0.028	1	0.007	0.951	0	1	0.014	0.984	0.007
30	1	0.017	1	0.009	0.961	0.009	1	0.015	1	0.021
36	1	0.006	1	0.007	0.991	0.019	1	0.019	1	0.024
40	1	0.014	1	0.011	0.95	0	1	0.026	1	0.026
45	1	0.019	1	0.013	0.997	0.014	1	0.01	1	0.028

Table 66. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for burst signals

66. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.026	1	0.019	1	0.037	1	0.029	1	0.023
16	1	0.027	1	0.022	1	0.015	1	0.042	1	0.027
20	1	0.021	1	0.026	1	0.037	1	0.028	1	0.039
25	1	0.018	1	0.022	1	0.03	1	0.023	1	0.035
30	1	0.025	1	0.019	1	0.017	1	0.016	1	0.036
36	1	0.025	1	0.025	1	0.017	1	0.013	1	0.033
40	1	0.031	1	0.025	1	0.017	1	0.024	1	0.022
45	1	0.019	1	0.016	1	0.022	1	0.029	1	0.035

Table 67. Hexagonal SOM detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

67. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.986	0.001	0.966	0.005	0.997	0.003	0.968	0	0.929	0
16	0.955	0	1	0.008	0.998	0.007	0.96	0	0.922	0
20	1	0.013	0.998	0.01	0.95	0	0.967	0	0.953	0
25	1	0.008	1	0.009	1	0.008	0.974	0	0.902	0
30	1	0.005	1	0.008	1	0.009	0.998	0.011	0.979	0
36	1	0.007	1	0.008	1	0.005	0.999	0.011	0.981	0
40	1	0.013	1	0.013	1	0.009	0.987	0	0.975	0
45	1	0.008	1	0.008	1	0.018	0.997	0.012	0.995	0.01

Table 68. Hexagonal SOM detection– P_D and false alarm – P_{Fa} ratios for frequency hopping signals

68. lentelė. Šešiakampio Kohonen tinklo nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.969	0.012	1	0.019	1	0.016	0.994	0.002	0.913	0
16	0.967	0.01	1	0.023	1	0.014	0.97	0.002	0.96	0
20	1	0.018	1	0.015	1	0.013	0.996	0.01	0.947	0
25	1	0.02	1	0.025	1	0.019	0.953	0.01	0.943	0.008
30	1	0.023	1	0.012	1	0.023	1	0.011	0.971	0.018
36	1	0.015	1	0.012	0.93	0.003	1	0.015	0.965	0.004
40	1	0.011	1	0.011	1	0.014	0.966	0.009	0.958	0.003
45	1	0.021	1	0.017	1	0.013	0.993	0.019	0.967	0.014

SOM with inner weights.

Table 69. SOM with inner weights self-training durations for narrow-band signals

69. lentelė. Kohonen tinklo su vidiniais svoriais mokymosi trukmė siaurajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	51	100	51	65	51
16	63	75	51	51	98
20	51	63	51	63	51
25	82	60	51	51	51
30	45	86	51	101	51
36	51	58	51	97	51
40	51	101	51	51	51
45	81	64	51	57	51

Table 70. SOM with inner weights self-training durations for burst signals

70. lentelė. Kohonen tinklo su vidiniais svoriais mokymosi trukmė trumpų emisijų signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	51	51	51	51	51
16	51	51	51	51	51
20	112	51	98	51	51
25	51	51	51	51	51
30	51	51	51	51	51
36	62	97	51	51	51
40	51	51	65	51	51
45	51	51	51	51	74

Table 71. SOM with inner weights self-training durations for wide-band signals

71. lentelė. Kohonen tinklo su vidiniais svoriais mokymosi trukmė plačiajuosčiams signalams

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	51	51	51	51	51
16	62	51	44	51	51
20	65	51	51	51	51
25	51	51	85	51	51
30	51	51	51	51	101
36	51	51	51	51	51
40	51	51	51	51	51
45	51	51	51	51	51

Table 72. SOM with inner weights self-training for frequency hopping signals

72. lentelė. Kohonen tinklo su vidiniais svoriais mokymosi trukmė signalams su besikeičiančiu nešlio dažniu

Network size	φ_{AD}	φ_{ADN}	φ_{Haar}	φ_{Deb}	φ_{Deb3}
9	51	49	51	84	51
16	51	51	51	56	51
20	51	45	51	71	51
25	65	65	55	66	63
30	51	51	51	64	64
36	52	51	51	51	71
40	51	51	51	85	51
45	51	51	51	44	52

Table 73. SOM with inner weights detection – P_D and false alarm – P_{Fa} ratios for narrow-band signals

73. lentelė. Kohonen tinklo su vidiniais svoriais nustatymo – P_D ir klaidos – P_{Fa} santykiai siaurajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	0.961	0	0.941	0.003	0.951	0	0.937	0	0.958	0.009
16	0.924	0	0.945	0	0.918	0	0.984	0.002	0.962	0
20	0.996	0	0.974	0	0.961	0	0.982	0	0.984	0.008
25	0.949	0	0.98	0	0.922	0	1	0.009	0.949	0
30	0.96	0	0.99	0.001	0.972	0	1	0.004	0.989	0.002
36	0.96	0	1	0.006	0.995	0.005	1	0.011	0.967	0
40	0.962	0	1	0.005	1	0.007	0.988	0.007	0.963	0
45	0.985	0	1	0.013	0.978	0	0.975	0	0.911	0

Table 74. SOM with inner weights detection – P_D and false alarm – P_{Fa} ratios for burst signals

74. lentelė. Kohonen tinklo su vidiniais svoriais nustatymo – P_D ir klaidos – P_{Fa} santykiai trumpų emisijų signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.019	1	0.017	0.951	0	1	0.009	1	0.017
16	1	0.017	1	0.011	1	0.007	1	0.012	1	0.016
20	1	0.014	1	0.015	1	0.01	1	0.008	1	0.03
25	1	0.011	1	0.01	1	0.019	1	0.003	0.97	0.017
30	1	0.015	1	0.007	1	0.009	1	0.006	0.973	0.016
36	1	0.013	1	0.014	1	0.017	1	0.009	0.994	0.032
40	1	0.009	1	0.009	1	0.013	1	0.014	0.988	0.009
45	1	0.009	1	0.01	1	0.01	1	0.009	0.984	0.014

Table 75. SOM with inner weights detection – P_D and false alarm – P_{Fa} ratios for wide-band signals

75. lentelė. Kohonen tinklo su vidiniais svoriais nustatymo – P_D ir klaidos – P_{Fa} santykiai plačiajuosčiams signalams

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.011	1	0.014	0.997	0.003	0.968	0	0.929	0
16	1	0.009	1	0.009	0.998	0.007	0.96	0	0.922	0
20	1	0.006	1	0.006	0.95	0	0.967	0	0.953	0
25	1	0.005	0.943	0	1	0.008	0.974	0	0.902	0
30	0.955	0.007	1	0.006	1	0.009	0.998	0.011	0.979	0
36	1	0.014	1	0.015	1	0.005	0.999	0.011	0.981	0
40	0.96	0.014	0.962	0.008	1	0.009	0.987	0	0.975	0
45	1	0.008	1	0.006	1	0.018	0.997	0.012	0.995	0.01

Table 76. SOM with inner weights detection– P_D and false alarm – P_{Fa} ratios for frequency hopping signals

76. lentelė. Kohonen tinklo su vidiniais svoriais nustatymo – P_D ir klaidos – P_{Fa} santykiai besikeičiančiu nešlio dažniu

Network size	φ_{AD}		φ_{ADN}		φ_{Haar}		φ_{Deb}		φ_{Deb3}	
	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}	P_D	P_{Fa}
9	1	0.02	1	0.02	1	0.017	1	0.022	0.885	0
16	1	0.019	0.992	0.019	1	0.015	1	0.022	1	0.019
20	1	0.01	1	0.017	1	0.014	1	0.025	1	0.015
25	1	0.015	0.995	0.009	1	0.02	1	0.02	1	0.027
30	1	0.029	1	0.007	1	0.014	1	0.013	0.873	0
36	1	0.02	1	0.019	1	0.015	1	0.018	1	0.027
40	1	0.016	1	0.012	1	0.01	1	0.02	0.86	0
45	1	0.013	1	0.021	1	0.015	1	0.012	1	0.03