Explainable machine learning model for liquefaction potential assessment of soils using XGBoost-SHAP

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Supplementary material

Description of case history database

The dataset used in this study is reproduced from Boulanger and Idriss (2014, 2016) after dropping and determining a few parameters. The processed dataset which was considered in the paper for the liquefaction potential assessment model development are shown in Table C.1. All the notations are as per the Table 1 of the paper. The dataset which obtained after performing the oversampling technology on the training dataset are shown in Table C.2. The codes associated with the XGBoost model development and the SHAP method are available in the GitHub repository

(Link: https://github.com/Kaushikjas10/Liquefaction-XGBoost-SHAP-Jas-Dodagoudar.git.).

Table C.1

Final processed dataset for model development [Data reproduced from Boulanger and Idriss (2014, 2016)].

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
0	7.6	0.162	4.4	1.1	49	2.11	3	61.2	0.97	1.06	1	3	3.45E-06	1
1	7.6	0.162	3.1	1.4	40	2.18	5	51.1	0.98	1.07	1	3	2.11E-06	1
2	7.6	0.162	5.5	1.7	61	1.84	5	152.1	0.96	1.08	0.98	1	2.28E-05	0
3	7.2	0.6	2.9	3.1	50	2.23	18	54.7	0.98	1.05	1.01	1.2	1.49E-06	1
4	7.2	0.3	1.4	1.4	24	2.36	16	31.5	0.99	1.09	1.01	0.6	5.99E-07	1
5	7	0.3	3.5	1	40	2.31	60	96.8	0.97	1.1	1.04	1	8.5E-07	0
6	7.6	0.64	6.2	3.7	85	2.27	5	71	0.95	1.02	1	1.1	1.13E-06	1
7	7.6	0.64	4.7	1.1	49	1.76	4	159.3	0.97	1.1	0.97	0.6	0.00004	0
8	7.6	0.64	2.7	1.5	36	1.79	6	122.3	0.99	1.1	0.99	0.6	3.24E-05	1
9	7.6	0.64	3.4	3	55	2.23	41	112.2	0.98	1.07	0.99	0.8	1.49E-06	1
10	7.6	0.64	6.3	2.2	72	1.83	3	117.1	0.95	1.04	0.99	2.2	2.45E-05	1
11	7.6	0.64	4.8	1.1	50	1.84	10	125	0.97	1.09	0.99	1.2	2.28E-05	0
12	7.6	0.64	5.3	1.5	57	2.14	4	81.9	0.96	1.05	0.99	1.6	2.8E-06	1
13	7.6	0.61	2	0.9	24	2.21	9	69.1	0.99	1.1	1	1.2	1.71E-06	1
14	7.6	0.58	5.6	1.1	60	1.78	5	141.4	0.96	1.08	0.98	1.6	3.47E-05	1
15	7.6	0.26	6.6	3.5	89	1.74	2	163.1	0.95	1.02	0.97	1.2	0.000046	0
16	7.6	0.25	3.3	1.1	39	1.85	5	69.8	0.98	1.08	1	2.5	2.13E-05	1
17	7.6	0.25	3.6	3.1	58	1.57	5	128.3	0.98	1.07	0.99	0.9	0.000151	0
18	7.6	0.25	2.3	0.8	27	1.73	5	76.6	0.99	1.1	0.99	0.9	4.93E-05	1
19	7.6	0.2	6.3	2.5	78	1.5	2	157.4	0.95	1.05	0.98	3.4	0.000247	0
20	7.6	0.18	3.3	2.3	48	1.97	5	52.6	0.98	1.05	1	1.3	9.19E-06	1
21	7.6	0.16	7.4	2.3	86	1.81	2	72.6	0.94	1.01	0.99	3.3	2.82E-05	0
22	7.6	0.12	4	0.2	38	2.3	75	90.2	0.97	1.1	0.99	1	9.12E-07	1
23	7.6	0.12	2	0.2	20	2.28	75	81.8	0.99	1.1	0.99	2	1.05E-06	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
24	7.6	0.12	3.3	1	38	2.59	75	72.7	0.98	1.08	0.99	1	1.2E-07	1
25	6.53	0.13	3.9	2.7	57	2.55	85	90.1	0.95	1.06	1.08	2.6	1.58E-07	0
26	6.53	0.51	3.2	1.5	41	2.1	20	82.7	0.96	1.08	1.07	3.2	3.7E-06	1
27	6.53	0.2	3.5	2.1	49	2.41	64	76.6	0.96	1.06	1.06	1	4.22E-07	1
28	6.53	0.2	2.4	2.1	39	1.92	18	128.9	0.98	1.1	1.17	0.6	0.000013	0
29	6.33	0.19	2.7	2.2	43	1.81	8	54.9	0.97	1.06	1.05	1	2.82E-05	1
30	6.33	0.19	2.9	2	43	2.35	51	80.6	0.97	1.08	1.08	1.8	6.43E-07	1
31	6.33	0.19	3	2.2	46	2.37	52	83.5	0.96	1.07	1.09	3.2	5.59E-07	1
32	6.33	0.19	2.3	2	38	2.11	32	96.7	0.98	1.1	1.11	0.6	3.45E-06	1
33	5.9	0.32	3.9	2.7	57	2.55	85	90.1	0.94	1.06	1.14	2.6	1.58E-07	1
34	5.9	0.09	3.2	1.5	41	2.1	20	82.7	0.95	1.08	1.12	3.2	3.7E-06	0
35	5.9	0.2	3.5	2.1	49	2.41	64	76.6	0.95	1.06	1.11	1	4.22E-07	1
36	5.9	0.2	2.4	2.1	39	1.92	18	128.9	0.97	1.1	1.3	0.6	0.000013	0
37	5.9	0.26	4.8	1.2	54	2.13	30	120.6	0.92	1.08	1.25	4.4	0.000003	1
38	7.7	0.17	1.8	0.8	23	2.22	5	37.5	0.99	1.09	0.99	2	1.6E-06	1
39	7.7	0.17	4.5	1	49	2.29	5	34.9	0.97	1.04	0.99	2.2	9.78E-07	1
40	7.7	0.17	2.9	2.4	47	2.1	5	62	0.99	1.06	0.99	1	3.7E-06	0
41	6.88	0.3	2.8	1.6	38	2.08	2	83	0.98	1.09	1.04	2.5	4.25E-06	1
42	6.88	0.5	2.4	0.8	29	2.07	20	133.2	0.98	1.1	1.11	1.6	4.56E-06	1
43	6.88	0.5	3.4	2.4	51	2.24	30	146.8	0.97	1.1	1.14	1.9	1.39E-06	1
44	6.88	0.5	7.3	6.8	124	2.3	20	107.8	0.9	0.98	1.07	1	9.12E-07	1
45	6.6	0.37	2.8	1.2	35	1.9	35	162.6	0.97	1.1	1.28	1	0.000015	1
46	6.6	0.4	7.2	1.7	79	2.41	30	67.3	0.89	1.02	1.05	1.6	4.22E-07	1
47	6.6	0.4	4.2	1.5	51	1.67	15	125.4	0.95	1.09	1.14	1.6	0.000075	0
48	6.6	0.39	5.5	2.5	71	1.82	5	73	0.93	1.03	1.05	0.9	2.63E-05	1
49	6.6	0.43	2.7	0.5	29	1.97	1	56.8	0.97	1.1	1.04	3	9.19E-06	1
50	6.6	0.37	1.9	0.9	25	1.41	1	156.4	0.98	1.1	1.25	0.5	0.000463	0
51	6.6	0.28	5.1	1.2	54	1.82	1	83.9	0.93	1.06	1.06	3.4	2.63E-05	1
52	6.6	0.31	8	2.5	94	1.76	5	75.1	0.88	1.01	1.05	3	0.00004	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
53	6.6	0.27	5.5	1.2	60	1.75	1	79.9	0.93	1.05	1.06	1.4	4.29E-05	1
54	6.6	0.42	7.8	1.6	84	1.76	5	83	0.88	1.02	1.06	1.5	0.00004	1
55	6.6	0.41	5.9	2.1	72	1.67	5	94.6	0.92	1.04	1.08	1.4	0.000075	0
56	6.6	0.44	3.8	0.8	41	1.88	5	61.3	0.96	1.07	1.04	3.5	1.73E-05	1
57	6.6	0.44	1.9	0.6	22	1.62	5	61.5	0.98	1.1	1.04	1.8	0.000106	1
58	6.6	0.26	5	1.3	56	1.89	5	57.1	0.94	1.04	1.04	6.2	1.61E-05	1
59	6.6	0.27	4.4	1.4	51	2.23	5	47	0.95	1.05	1.04	1.8	1.49E-06	0
60	6.6	0.26	4.7	4.4	80	1.58	5	149.9	0.94	1.04	1.22	0.6	0.000141	0
61	6.6	0.27	4.1	2.4	57	1.85	10	66.6	0.95	1.05	1.05	1	2.13E-05	1
62	6.22	0.09	3.5	2.1	49	2.41	64	76.6	0.95	1.06	1.08	1	4.22E-07	0
63	6.22	0.133	4.8	1.2	54	2.13	30	120.6	0.93	1.08	1.2	4.4	0.000003	0
64	6.54	0.174	3.9	2.7	57	2.55	85	90.1	0.95	1.06	1.08	2.6	1.58E-07	0
65	6.54	0.2	3.5	2.1	49	2.41	64	76.6	0.96	1.06	1.06	1	4.22E-07	0
66	6.54	0.18	2.4	2.1	39	1.92	18	128.9	0.98	1.1	1.16	0.6	0.000013	0
67	6.54	0.206	4.8	1.2	54	2.13	30	120.6	0.94	1.08	1.14	4.4	0.000003	1
68	6.93	0.28	3.6	1.8	47	1.87	1	73.2	0.97	1.07	1.03	3.6	1.85E-05	1
69	6.93	0.28	3.3	2.5	50	1.56	1	123.5	0.97	1.09	1.08	2.7	0.000162	1
70	6.93	0.28	3.9	3.4	63	1.33	1	191.3	0.96	1.1	1.24	1	0.000811	0
71	6.93	0.28	2.5	1.8	38	1.52	2	121	0.98	1.1	1.08	1	0.000214	1
72	6.93	0.28	8	1.8	87	1.16	4	311.9	0.89	1.04	1.24	4	0.002664	0
73	6.93	0.28	1.4	1.4	24	1.86	4	51	0.99	1.1	1.02	0.6	1.98E-05	1
74	6.93	0.28	3.5	1.4	43	1.47	4	142.4	0.97	1.1	1.12	1	0.000304	0
75	6.93	0.28	5	1.8	60	1.57	4	114.8	0.94	1.06	1.07	0.6	0.000151	1
76	6.93	0.28	7	1.8	78	1.34	1	206.3	0.91	1.07	1.24	2	0.000756	0
77	6.93	0.28	2.5	1.7	37	1.52	4	134.6	0.98	1.1	1.1	1	0.000214	0
78	6.93	0.28	2	1.7	32	1.41	4	161.7	0.99	1.1	1.17	1	0.000463	0
79	6.93	0.28	6.5	1.7	73	1.23	1	202.5	0.92	1.09	1.24	1	0.001632	0
80	6.93	0.28	3.5	1.8	47	1.18	1	200.2	0.97	1.1	1.24	0.6	0.002316	0
81	6.93	0.28	4.1	2.6	59	1.35	1	160.6	0.96	1.1	1.16	0.6	0.000705	0

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
82	6.93	0.28	4.7	3.7	73	1.57	1	107.7	0.95	1.04	1.06	0.6	0.000151	0
83	6.93	0.28	3.5	2	48	1.37	4	164.5	0.97	1.1	1.17	1	0.000613	0
84	6.93	0.28	3.1	1.9	44	1.38	4	126.8	0.97	1.1	1.09	3	0.000571	0
85	6.93	0.28	2.1	1.5	31	1.9	4	42.5	0.98	1.08	1.02	0.6	0.000015	1
86	6.93	0.28	2.6	1.7	38	1.36	4	149.3	0.98	1.1	1.13	0.6	0.000657	0
87	6.93	0.28	4.1	1.9	53	1.94	15	106.7	0.96	1.07	1.06	0.6	1.13E-05	1
88	6.93	0.28	4.1	1.9	53	2.1	15	81	0.96	1.06	1.04	0.6	3.7E-06	1
89	6.93	0.28	4.7	3	67	2.04	10	58.9	0.95	1.03	1.03	0.6	5.63E-06	1
90	6.93	0.28	4.2	2.7	60	1.9	10	72.5	0.96	1.04	1.03	0.6	0.000015	1
91	6.93	0.28	2.9	1.2	36	1.59	5	108.3	0.97	1.1	1.06	0.6	0.000131	1
92	6.93	0.28	2	1	26	1.88	5	52.8	0.99	1.1	1.02	0.6	1.73E-05	1
93	6.93	0.28	2.2	1	28	1.88	15	71.8	0.98	1.1	1.03	0.6	1.73E-05	1
94	6.93	0.28	2.9	1.3	37	1.65	3	86.7	0.97	1.1	1.04	0.6	8.63E-05	1
95	6.93	0.28	3.6	1.2	43	1.4	3	116.6	0.97	1.1	1.07	0.6	0.000497	1
96	6.93	0.28	11	2.4	120	2.24	30	85.9	0.84	0.98	1.04	0.6	1.39E-06	1
97	6.93	0.28	8.3	1.4	87	2.35	30	91.2	0.89	1.02	1.04	0.6	6.43E-07	1
98	6.93	0.28	8.6	1.3	89	2.27	30	90.6	0.88	1.01	1.04	0.6	1.13E-06	1
99	6.93	0.28	9.8	2.2	107	2.37	27	76.1	0.86	1	1.03	0.6	5.59E-07	1
100	6.93	0.28	4.4	1.5	52	1.57	3	112.1	0.95	1.08	1.07	0.6	0.000151	1
101	6.93	0.28	5.5	2.8	73	2.21	3	24.4	0.94	1.02	1.02	0.6	1.71E-06	1
102	6.93	0.26	2.8	2.4	47	2.4	23	60.3	0.98	1.06	1.03	0.6	4.53E-07	1
103	6.93	0.26	2.6	2.4	45	2.15	5	35.8	0.98	1.05	1.02	1.2	2.61E-06	1
104	6.93	0.36	5.8	4.9	97	2.1	27	75.9	0.93	1	1.03	3	3.7E-06	1
105	6.93	0.36	6.7	4.9	100	1.83	13	94.1	0.92	1	1.05	2.5	2.45E-05	1
106	6.93	0.36	6	4.9	99	2.03	25	87	0.93	1	1.04	3.7	6.04E-06	1
107	6.93	0.36	8.2	3	102	2.06	20	100.6	0.89	1	1.05	2.7	4.89E-06	0
108	6.93	0.36	7.4	4.8	111	1.72	4	106.1	0.9	0.99	1.06	4.5	5.29E-05	1
109	6.93	0.36	8	4.8	116	1.79	7	89.1	0.89	0.99	1.04	5	3.24E-05	1
110	6.93	0.36	7.4	4.2	105	1.9	11	86.5	0.91	1	1.04	5	0.000015	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
111	6.93	0.22	4.9	2.5	67	2.08	12	54.8	0.95	1.03	1.02	5	4.25E-06	0
112	6.93	0.22	2.9	1.9	43	2	11	50.2	0.97	1.06	1.02	2.6	7.45E-06	1
113	6.93	0.22	4.7	1.8	59	1.94	10	68.2	0.95	1.04	1.03	2	1.13E-05	1
114	6.93	0.22	3.2	2.7	53	1.85	12	95.8	0.97	1.07	1.05	0.7	2.13E-05	0
115	6.93	0.22	4.3	2.1	58	1.88	9	75	0.96	1.05	1.03	4.4	1.73E-05	1
116	6.93	0.22	3.5	0.8	39	2.09	24	78.4	0.97	1.09	1.04	4	3.97E-06	1
117	6.93	0.21	6	2.1	73	2.02	10	57.5	0.93	1.02	1.02	4.2	6.47E-06	1
118	6.93	0.21	7.3	3	93	1.79	5	89.1	0.91	1.01	1.04	1.6	3.24E-05	1
119	6.93	0.22	4.5	3.4	72	1.77	4	93.3	0.95	1.04	1.05	2.1	3.73E-05	1
120	6.93	0.38	5.3	3.5	79	1.86	9	93.3	0.94	1.02	1.05	4	1.98E-05	0
121	6.93	0.38	6	4.1	91	2.06	18	79.2	0.93	1.01	1.04	2.6	4.89E-06	1
122	6.93	0.4	8.5	5.6	128	1.97	12	78.9	0.89	0.98	1.04	4	9.19E-06	1
123	6.93	0.4	6.5	6.2	115	1.75	15	163.4	0.92	0.98	1.17	1.2	4.29E-05	0
124	6.93	0.13	8.7	5	124	2.18	13	47.9	0.88	0.99	1.02	1.4	2.11E-06	1
125	6.93	0.13	5.3	4.2	86	2.09	30	85.1	0.94	1.02	1.04	2.2	3.97E-06	0
126	6.93	0.26	4	2.4	58	2.09	15	74	0.96	1.05	1.03	3.1	3.97E-06	0
127	6.93	0.26	2.9	1.8	43	2.23	42	85.7	0.97	1.08	1.04	2.7	1.49E-06	0
128	6.93	0.34	7.5	5	113	2.14	18	66.2	0.9	0.99	1.03	1	2.8E-06	1
129	6.93	0.33	7	5.3	112	2.11	13	62	0.91	0.99	1.03	3.6	3.45E-06	1
130	6.93	0.38	5.2	3.5	79	1.97	18	91.4	0.94	1.02	1.04	3.5	9.19E-06	1
131	6.93	0.47	2.7	1.5	38	2.07	15	99.5	0.98	1.1	1.05	1	4.56E-06	1
132	6.93	0.13	4.5	1.8	57	2.06	14	66.6	0.95	1.05	1.03	2.3	4.89E-06	0
133	6.93	0.13	4	1.7	52	2	10	65.9	0.96	1.05	1.03	4.8	7.45E-06	0
134	6.93	0.12	6.9	6.4	120	2.5	7	36.7	0.91	0.99	1.02	1	2.25E-07	0
135	6.93	0.12	7.2	6.4	123	2.28	9	53.8	0.91	0.99	1.02	1.6	1.05E-06	0
136	6.93	0.24	3.8	3	59	1.77	4	80.8	0.96	1.05	1.04	1.5	3.73E-05	1
137	6.93	0.24	6.2	5.5	102	2.22	10	112.7	0.93	1	1.07	1.3	1.6E-06	0
138	6.93	0.28	6.3	3	84	1.89	3	61.6	0.92	1.01	1.03	1.5	1.61E-05	1
139	6.93	0.18	5.5	3.5	70	2.35	52	76.3	0.94	1.03	1.03	3.5	6.43E-07	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
140	6.93	0.28	6.3	3	84	1.95	8	60.7	0.92	1.01	1.03	2.5	1.06E-05	1
141	6.93	0.28	7.5	3	95	1.78	12	96.4	0.9	1.01	1.05	3	3.47E-05	1
142	6.93	0.16	5	1.5	59	2.06	20	84.2	0.94	1.05	1.04	4	4.89E-06	1
143	6.69	0.84	8.9	7.2	147	2.33	50	127.5	0.86	0.95	1.13	1.5	7.39E-07	1
144	6.69	0.8	3.9	3.4	66	1.97	20	132.5	0.96	1.06	1.15	1	9.19E-06	1
145	6.9	0.37	7	2	76	1.74	2	87.3	0.91	1.03	1.04	2	0.000046	1
146	6.9	0.65	11.8	3.1	125	1.87	13	186.2	0.82	0.95	1.26	1.5	1.85E-05	0
147	6.9	0.5	3.8	2	50	1.96	20	97.4	0.96	1.07	1.05	2.5	9.85E-06	1
148	6.9	0.7	5	2.5	68	1.59	0	163.5	0.94	1.07	1.18	2	0.000131	0
149	6.9	0.6	4.6	1.4	54	1.4	0	131.1	0.95	1.08	1.1	1.2	0.000497	1
150	6.9	0.5	3.4	3	58	1.88	13	178.6	0.97	1.1	1.23	0.8	1.73E-05	0
151	6.9	0.6	6.5	1.8	75	2.23	41	76.7	0.92	1.03	1.04	5	1.49E-06	1
152	6.9	0.6	4.5	1.8	57	2.02	25	107.8	0.95	1.06	1.07	3	6.47E-06	1
153	6.9	0.6	4	2.5	57	1.91	15	72.8	0.96	1.05	1.03	2	0.000014	1
154	6.9	0.45	4.8	2.1	60	2.06	28	99.8	0.95	1.05	1.06	1.5	4.89E-06	1
155	6.9	0.45	6	2.6	76	2.59	70	80.9	0.93	1.03	1.04	2	1.2E-07	1
156	6.9	0.65	4.3	2	55	1.65	0	116.7	0.96	1.07	1.08	0.5	8.63E-05	1
157	6.9	0.65	1.4	1	21	1.48	0	134.3	0.99	1.1	1.11	0.7	0.000284	0
158	6.9	0.6	4.5	2.5	61	1.79	7	82.3	0.95	1.05	1.04	2	3.24E-05	1
159	6.9	0.45	3.5	2.6	53	2.32	48	86.3	0.97	1.06	1.04	0.6	7.93E-07	1
160	6.9	0.6	5.5	2.4	69	2.06	28	91.6	0.94	1.04	1.05	1.3	4.89E-06	1
161	6.9	0.6	5.5	2.4	69	2.04	26	99.7	0.94	1.04	1.06	1	5.63E-06	1
162	6.9	0.65	3.8	2	51	1.64	0	165.1	0.96	1.1	1.18	1.3	9.26E-05	0
163	6.9	0.4	5.5	1.5	62	2.17	36	79.5	0.94	1.04	1.04	3	2.27E-06	1
164	6.9	0.6	2.8	1.9	41	1.59	0	156.8	0.98	1.1	1.16	0.8	0.000131	0
165	6.9	0.45	3.7	1.6	47	2.09	30	81.1	0.96	1.07	1.04	1	3.97E-06	1
166	6.9	0.5	5.2	2	64	2.1	31	82	0.94	1.04	1.04	2.2	3.7E-06	1
167	6.9	0.5	4.1	3	62	2.1	31	216.3	0.96	1.1	1.26	0.6	3.7E-06	0
168	7.51	0.37	1.6	0.5	19	2.32	5	16.1	0.99	1.08	1	1.6	7.93E-07	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
169	7.51	0.37	1.8	1	25	2.44	16	40.5	0.99	1.09	1	1.2	3.42E-07	1
170	7.51	0.4	2.3	1	29	2.55	12	28.9	0.99	1.07	1	1	1.58E-07	1
171	7.51	0.37	3.6	1	41	1.77	9	91	0.98	1.09	1	4.8	3.73E-05	1
172	7.51	0.4	3.8	3.3	63	1.84	35	132.5	0.97	1.07	1	1	2.28E-05	1
173	7.51	0.4	3.7	0.4	37	2.13	35	97.7	0.98	1.1	1	0.7	0.000003	1
174	7.51	0.4	2.2	1.5	32	2.36	65	77.2	0.99	1.1	1	0.7	5.99E-07	1
175	7.51	0.4	2.3	0.5	25	2.05	2	34.1	0.99	1.09	1	1.5	5.25E-06	1
176	7.51	0.4	2.4	0.5	26	1.8	42	113.2	0.99	1.1	1	1.2	3.02E-05	1
177	7.51	0.4	2.1	0.5	23	1.9	65	104.1	0.99	1.1	1	1.2	0.000015	1
178	7.51	0.4	2.5	1.7	37	2.1	15	62.5	0.99	1.08	1	1	3.7E-06	1
179	7.51	0.4	2.5	0.6	28	2.34	82	85.4	0.99	1.1	1	2	6.89E-07	1
180	7.51	0.4	2.2	1.7	34	1.84	12	129.6	0.99	1.1	1	0.9	2.28E-05	1
181	7.51	0.4	3.2	2.5	50	1.91	12	121.6	0.98	1.09	1	1	0.000014	0
182	7.51	0.3	4.9	0.8	51	1.84	11	85.1	0.96	1.07	1	3	2.28E-05	1
183	7.62	0.38	2.5	1	31	2.28	38	82.8	0.99	1.1	0.99	1	1.05E-06	1
184	7.62	0.38	3.5	1	40	2.46	60	72.5	0.98	1.08	0.99	2	2.98E-07	1
185	7.62	0.38	7	1	72	2.52	65	91.4	0.94	1.03	0.99	4	1.96E-07	1
186	7.62	0.6	3	1.1	36	2.16	35	100.1	0.98	1.1	0.99	2	2.43E-06	1
187	7.62	0.6	4.5	1.2	51	2.35	14	68.6	0.97	1.06	0.99	1	6.43E-07	1
188	7.62	0.25	4.5	0.7	46	2.27	45	99.6	0.97	1.08	0.99	3	1.13E-06	1
189	7.62	0.25	5	0.6	50	2.39	54	84.2	0.96	1.07	0.99	1	4.86E-07	1
190	7.62	0.25	3.5	1.1	41	2.05	27	84.5	0.98	1.08	0.99	1.4	5.25E-06	1
191	7.62	0.25	6.5	1.2	69	2.09	30	90.9	0.95	1.04	0.99	2.6	3.97E-06	1
192	7.62	0.25	5.5	3.5	79	2.47	61	78.3	0.96	1.02	0.99	3	2.77E-07	1
193	7.62	0.25	6	0.7	61	2.11	32	90.4	0.95	1.05	0.99	3	3.45E-06	1
194	7	0.187	4.8	2	61	1.87	4	51.1	0.95	1.04	1.02	1.1	1.85E-05	0
195	6.2	0.347	4.8	2	61	1.87	4	51.1	0.93	1.04	1.06	1.1	1.85E-05	1
196	7	0.183	3.7	1.7	48	1.8	7	101.2	0.97	1.08	1.05	1.6	3.02E-05	0
197	6.2	0.396	3.7	1.7	48	1.8	7	101.2	0.95	1.08	1.14	1.6	3.02E-05	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
198	7	0.167	7.3	1.3	80	1.85	4	83.8	0.91	1.02	1.03	3	2.13E-05	1
199	6.2	0.323	7.3	1.3	80	1.85	4	83.8	0.88	1.02	1.1	3	2.13E-05	1
200	7	0.219	5.5	1.4	64	1.62	0	146.3	0.94	1.07	1.11	2	0.000106	0
201	6.2	0.46	5.5	1.4	64	1.62	0	146.3	0.91	1.07	1.32	2	0.000106	1
202	7	0.199	3.8	1.8	48	2.15	24	78.7	0.96	1.07	1.03	0.3	2.61E-06	1
203	6.2	0.382	3.8	1.8	48	2.15	24	78.7	0.95	1.07	1.09	0.3	2.61E-06	1
204	7	0.237	5.2	1	58	1.65	3	107.5	0.94	1.06	1.05	2.95	8.63E-05	1
205	6.2	0.188	5.2	1	58	1.65	3	107.5	0.92	1.06	1.15	2.95	8.63E-05	0
206	7	0.227	3.6	2	50	1.96	8	60.6	0.97	1.06	1.02	0.95	9.85E-06	1
207	6.2	0.183	3.6	2	50	1.96	8	60.6	0.95	1.06	1.07	0.95	9.85E-06	1
208	7	0.239	1.9	0.9	25	1.86	9	53.9	0.99	1.1	1.02	1.2	1.98E-05	1
209	6.2	0.186	1.9	0.9	25	1.86	9	53.9	0.98	1.1	1.06	1.2	1.98E-05	0
210	7	0.234	3.7	0.8	42	1.68	2	117.1	0.97	1.1	1.06	2.65	0.00007	1
211	6.2	0.187	3.7	0.8	42	1.68	2	117.1	0.95	1.1	1.19	2.65	0.00007	0
212	7	0.216	4.8	0.5	50	1.69	0	127.3	0.95	1.09	1.08	1	6.52E-05	1
213	6.2	0.186	4.8	0.5	50	1.69	0	127.3	0.93	1.09	1.23	1	6.52E-05	0
214	7	0.231	6.5	1.5	74	1.74	3	92.6	0.92	1.03	1.04	3.1	0.000046	1
215	6.2	0.181	2	1.5	30	2.05	22	75.1	0.98	1.1	1.08	0.9	5.25E-06	1
216	7	0.231	2.6	1.4	35	1.79	5	71	0.98	1.09	1.03	1.15	3.24E-05	1
217	6.2	0.182	2.6	1.4	35	1.79	5	71	0.97	1.09	1.08	1.15	3.24E-05	1
218	7	0.204	2	1.3	29	2.07	20	70.1	0.99	1.1	1.03	1.35	4.56E-06	1
219	6.2	0.186	2	1.3	29	2.07	20	70.1	0.98	1.1	1.08	1.35	4.56E-06	1
220	7	0.211	2.6	1.2	34	1.92	10	73.6	0.98	1.1	1.03	1.1	0.000013	1
221	6.2	0.186	2.6	1.2	34	1.92	10	73.6	0.97	1.1	1.08	1.1	0.000013	1
222	7	0.211	4.3	1.6	53	1.83	6	67.4	0.96	1.05	1.03	1.5	2.45E-05	1
223	6.2	0.172	4.3	1.6	53	1.83	6	67.4	0.94	1.05	1.07	1.5	2.45E-05	1
224	7	0.224	2.3	1.9	36	1.87	8	62	0.98	1.08	1.02	0.85	1.85E-05	1
225	6.2	0.177	2.3	1.9	36	1.87	8	62	0.97	1.08	1.07	0.85	1.85E-05	1
226	7	0.17	3.6	2	50	1.9	9	83.5	0.97	1.07	1.03	2.75	0.000015	1

Case index number	IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
227	6.2	0.351	3.6	2	50	1.9	9	83.5	0.95	1.07	1.1	2.75	0.000015	1
228	7	0.17	5.8	2	70	1.96	12	71.5	0.93	1.03	1.03	1.9	9.85E-06	1
229	6.2	0.354	5.8	2	70	1.96	12	71.5	0.91	1.03	1.08	1.9	9.85E-06	1
230	7	0.168	8.6	2.4	101	1.95	11	70.4	0.89	1	1.03	3.2	1.06E-05	1
231	6.2	0.346	8.6	2.4	101	1.95	11	70.4	0.84	1	1.08	3.2	1.06E-05	1
232	7	0.183	4.5	2.3	60	2.01	7	35.3	0.95	1.03	1.02	2	6.94E-06	0
233	6.2	0.339	4.5	2.3	60	2.01	7	35.3	0.93	1.03	1.05	2	6.94E-06	1
234	7	0.217	6.1	1.4	70	2.11	26	104.1	0.93	1.04	1.05	4.25	3.45E-06	1
235	6.2	0.455	6.1	1.4	70	2.11	26	104.1	0.9	1.04	1.14	4.25	3.45E-06	1
236	7	0.21	2.8	1	34	1.9	11	116.6	0.98	1.1	1.06	1.1	0.000015	0
237	6.2	0.447	2.8	1	34	1.9	11	116.6	0.97	1.1	1.18	1.1	0.000015	1
238	7	0.214	2.4	2	38	1.98	16	100.3	0.98	1.1	1.05	0.85	8.57E-06	0
239	6.2	0.451	2.4	2	38	1.98	16	100.3	0.97	1.1	1.13	0.85	8.57E-06	1
240	7	0.215	2.6	2	40	2.03	18	94.5	0.98	1.09	1.04	1.25	6.04E-06	0
241	6.2	0.45	2.6	2	40	2.03	18	94.5	0.97	1.09	1.12	1.25	6.04E-06	1
242	7	0.219	1.7	1.4	27	2.13	39	89.8	0.99	1.1	1.04	0.6	0.000003	1
243	6.2	0.453	1.7	1.4	27	2.13	39	89.8	0.98	1.1	1.11	0.6	0.000003	1
244	9	0.17	4.8	1.1	53	1.75	3	133.5	1.01	1.09	0.79	1.6	4.29E-05	0
245	9	0.18	4.2	2.5	60	1.77	5	87.3	1.01	1.05	0.92	0.8	3.73E-05	0
246	9	0.21	6.8	1.1	71	1.9	15	101.6	1.01	1.04	0.89	1	0.000015	1
247	9	0.22	9	1.3	93	1.74	2	99.1	1.01	1.01	0.89	1.2	0.000046	1
248	9	0.169	10.1	1.2	102	1.85	11	92.9	1	1	0.91	6.5	2.13E-05	0
249	9	0.199	2.8	1.2	36	2.03	25	98	1	1.1	0.9	1.6	6.04E-06	1
250	9	0.256	6.3	1.6	71	2.53	66	81.1	1.01	1.03	0.92	1.6	1.82E-07	1

Table C.2

Dataset corresponding to *R* value of 0.87 obtained after performing oversampling technology.

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.9	0.5	5.2	2	64	2.1	31	82	0.94	1.04	1.04	2.2	3.7E-06	1
6.93	0.12	7.2	6.4	123	2.28	9	53.8	0.91	0.99	1.02	1.6	1.05E-06	0
6.93	0.26	2.8	2.4	47	2.4	23	60.3	0.98	1.06	1.03	0.6	4.53E-07	1
7	0.187	4.8	2	61	1.87	4	51.1	0.95	1.04	1.02	1.1	1.85E-05	0
6.88	0.3	2.8	1.6	38	2.08	2	83	0.98	1.09	1.04	2.5	4.25E-06	1
7	0.239	1.9	0.9	25	1.86	9	53.9	0.99	1.1	1.02	1.2	1.98E-05	1
6.93	0.28	4.7	3.7	73	1.57	1	107.7	0.95	1.04	1.06	0.6	0.000151	0
6.93	0.28	3.3	2.5	50	1.56	1	123.5	0.97	1.09	1.08	2.7	0.000162	1
6.93	0.28	4.1	2.6	59	1.35	1	160.6	0.96	1.1	1.16	0.6	0.000705	0
7.7	0.17	2.9	2.4	47	2.1	5	62	0.99	1.06	0.99	1	3.7E-06	0
6.9	0.65	11.8	3.1	125	1.87	13	186.2	0.82	0.95	1.26	1.5	1.85E-05	0
6.93	0.28	4.2	2.7	60	1.9	10	72.5	0.96	1.04	1.03	0.6	0.000015	1
7.6	0.58	5.6	1.1	60	1.78	5	141.4	0.96	1.08	0.98	1.6	3.47E-05	1
6.33	0.19	2.7	2.2	43	1.81	8	54.9	0.97	1.06	1.05	1	2.82E-05	1
6.93	0.21	7.3	3	93	1.79	5	89.1	0.91	1.01	1.04	1.6	3.24E-05	1
7.2	0.3	1.4	1.4	24	2.36	16	31.5	0.99	1.09	1.01	0.6	5.99E-07	1
6.2	0.347	4.8	2	61	1.87	4	51.1	0.93	1.04	1.06	1.1	1.85E-05	1
6.93	0.36	8	4.8	116	1.79	7	89.1	0.89	0.99	1.04	5	3.24E-05	1
6.93	0.28	7.5	3	95	1.78	12	96.4	0.9	1.01	1.05	3	3.47E-05	1
7.6	0.64	6.3	2.2	72	1.83	3	117.1	0.95	1.04	0.99	2.2	2.45E-05	1
7.51	0.4	3.2	2.5	50	1.91	12	121.6	0.98	1.09	1	1	0.000014	0
6.2	0.183	3.6	2	50	1.96	8	60.6	0.95	1.06	1.07	0.95	9.85E-06	1
6.6	0.4	7.2	1.7	79	2.41	30	67.3	0.89	1.02	1.05	1.6	4.22E-07	1
7.51	0.4	2.3	0.5	25	2.05	2	34.1	0.99	1.09	1	1.5	5.25E-06	1

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
5.9	0.2	2.4	2.1	39	1.92	18	128.9	0.97	1.1	1.3	0.6	0.000013	0
6.54	0.18	2.4	2.1	39	1.92	18	128.9	0.98	1.1	1.16	0.6	0.000013	0
6.6	0.26	5	1.3	56	1.89	5	57.1	0.94	1.04	1.04	6.2	1.61E-05	1
6.53	0.2	2.4	2.1	39	1.92	18	128.9	0.98	1.1	1.17	0.6	0.000013	0
7.6	0.12	2	0.2	20	2.28	75	81.8	0.99	1.1	0.99	2	1.05E-06	1
6.6	0.31	8	2.5	94	1.76	5	75.1	0.88	1.01	1.05	3	0.00004	1
6.93	0.36	7.4	4.2	105	1.9	11	86.5	0.91	1	1.04	5	0.000015	1
6.69	0.84	8.9	7.2	147	2.33	50	127.5	0.86	0.95	1.13	1.5	7.39E-07	1
6.93	0.38	5.3	3.5	79	1.86	9	93.3	0.94	1.02	1.05	4	1.98E-05	0
7.62	0.38	2.5	1	31	2.28	38	82.8	0.99	1.1	0.99	1	1.05E-06	1
6.9	0.6	5.5	2.4	69	2.04	26	99.7	0.94	1.04	1.06	1	5.63E-06	1
6.93	0.22	2.9	1.9	43	2	11	50.2	0.97	1.06	1.02	2.6	7.45E-06	1
6.33	0.19	3	2.2	46	2.37	52	83.5	0.96	1.07	1.09	3.2	5.59E-07	1
7	0.183	3.7	1.7	48	1.8	7	101.2	0.97	1.08	1.05	1.6	3.02E-05	0
6.93	0.28	9.8	2.2	107	2.37	27	76.1	0.86	1	1.03	0.6	5.59E-07	1
6.2	0.46	5.5	1.4	64	1.62	0	146.3	0.91	1.07	1.32	2	0.000106	1
6.53	0.51	3.2	1.5	41	2.1	20	82.7	0.96	1.08	1.07	3.2	3.7E-06	1
6.53	0.13	3.9	2.7	57	2.55	85	90.1	0.95	1.06	1.08	2.6	1.58E-07	0
7	0.237	5.2	1	58	1.65	3	107.5	0.94	1.06	1.05	2.95	8.63E-05	1
6.2	0.346	8.6	2.4	101	1.95	11	70.4	0.84	1	1.08	3.2	1.06E-05	1
7.6	0.61	2	0.9	24	2.21	9	69.1	0.99	1.1	1	1.2	1.71E-06	1
7	0.17	3.6	2	50	1.9	9	83.5	0.97	1.07	1.03	2.75	0.000015	1
7	0.204	2	1.3	29	2.07	20	70.1	0.99	1.1	1.03	1.35	4.56E-06	1
6.2	0.181	2	1.5	30	2.05	22	75.1	0.98	1.1	1.08	0.9	5.25E-06	1
6.93	0.13	8.7	5	124	2.18	13	47.9	0.88	0.99	1.02	1.4	2.11E-06	1
6.9	0.5	4.1	3	62	2.1	31	216.3	0.96	1.1	1.26	0.6	3.7E-06	0
6.93	0.28	2.9	1.3	37	1.65	3	86.7	0.97	1.1	1.04	0.6	8.63E-05	1
7	0.21	2.8	1	34	1.9	11	116.6	0.98	1.1	1.06	1.1	0.000015	0
9	0.17	4.8	1.1	53	1.75	3	133.5	1.01	1.09	0.79	1.6	4.29E-05	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
7.51	0.4	2.1	0.5	23	1.9	65	104.1	0.99	1.1	1	1.2	0.000015	1
7	0.199	3.8	1.8	48	2.15	24	78.7	0.96	1.07	1.03	0.3	2.61E-06	1
6.93	0.34	7.5	5	113	2.14	18	66.2	0.9	0.99	1.03	1	2.8E-06	1
6.93	0.28	2.9	1.2	36	1.59	5	108.3	0.97	1.1	1.06	0.6	0.000131	1
7	0.219	1.7	1.4	27	2.13	39	89.8	0.99	1.1	1.04	0.6	0.000003	1
5.9	0.2	3.5	2.1	49	2.41	64	76.6	0.95	1.06	1.11	1	4.22E-07	1
7.6	0.25	2.3	0.8	27	1.73	5	76.6	0.99	1.1	0.99	0.9	4.93E-05	1
7	0.231	2.6	1.4	35	1.79	5	71	0.98	1.09	1.03	1.15	3.24E-05	1
6.93	0.28	8	1.8	87	1.16	4	311.9	0.89	1.04	1.24	4	0.002664	0
6.93	0.28	2.1	1.5	31	1.9	4	42.5	0.98	1.08	1.02	0.6	0.000015	1
6.93	0.16	5	1.5	59	2.06	20	84.2	0.94	1.05	1.04	4	4.89E-06	1
6.2	0.172	4.3	1.6	53	1.83	6	67.4	0.94	1.05	1.07	1.5	2.45E-05	1
6.93	0.28	1.4	1.4	24	1.86	4	51	0.99	1.1	1.02	0.6	1.98E-05	1
6.9	0.45	3.5	2.6	53	2.32	48	86.3	0.97	1.06	1.04	0.6	7.93E-07	1
6.93	0.28	3.6	1.8	47	1.87	1	73.2	0.97	1.07	1.03	3.6	1.85E-05	1
6.88	0.5	3.4	2.4	51	2.24	30	146.8	0.97	1.1	1.14	1.9	1.39E-06	1
6.69	0.8	3.9	3.4	66	1.97	20	132.5	0.96	1.06	1.15	1	9.19E-06	1
6.9	0.6	4.5	2.5	61	1.79	7	82.3	0.95	1.05	1.04	2	3.24E-05	1
6.33	0.19	2.3	2	38	2.11	32	96.7	0.98	1.1	1.11	0.6	3.45E-06	1
6.2	0.177	2.3	1.9	36	1.87	8	62	0.97	1.08	1.07	0.85	1.85E-05	1
7.51	0.3	4.9	0.8	51	1.84	11	85.1	0.96	1.07	1	3	2.28E-05	1
7	0.17	5.8	2	70	1.96	12	71.5	0.93	1.03	1.03	1.9	9.85E-06	1
6.9	0.65	3.8	2	51	1.64	0	165.1	0.96	1.1	1.18	1.3	9.26E-05	0
7.51	0.4	2.4	0.5	26	1.8	42	113.2	0.99	1.1	1	1.2	3.02E-05	1
7.6	0.25	3.6	3.1	58	1.57	5	128.3	0.98	1.07	0.99	0.9	0.000151	0
6.93	0.28	3.5	1.8	47	1.18	1	200.2	0.97	1.1	1.24	0.6	0.002316	0
6.6	0.44	1.9	0.6	22	1.62	5	61.5	0.98	1.1	1.04	1.8	0.000106	1
7.51	0.37	3.6	1	41	1.77	9	91	0.98	1.09	1	4.8	3.73E-05	1
6.93	0.26	4	2.4	58	2.09	15	74	0.96	1.05	1.03	3.1	3.97E-06	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.2	0.186	4.8	0.5	50	1.69	0	127.3	0.93	1.09	1.23	1	6.52E-05	0
9	0.169	10.1	1.2	102	1.85	11	92.9	1	1	0.91	6.5	2.13E-05	0
7	0.215	2.6	2	40	2.03	18	94.5	0.98	1.09	1.04	1.25	6.04E-06	0
5.9	0.09	3.2	1.5	41	2.1	20	82.7	0.95	1.08	1.12	3.2	3.7E-06	0
7.62	0.25	3.5	1.1	41	2.05	27	84.5	0.98	1.08	0.99	1.4	5.25E-06	1
6.2	0.186	1.9	0.9	25	1.86	9	53.9	0.98	1.1	1.06	1.2	1.98E-05	0
6.93	0.28	6.3	3	84	1.95	8	60.7	0.92	1.01	1.03	2.5	1.06E-05	1
6.93	0.21	6	2.1	73	2.02	10	57.5	0.93	1.02	1.02	4.2	6.47E-06	1
6.93	0.28	7	1.8	78	1.34	1	206.3	0.91	1.07	1.24	2	0.000756	0
6.9	0.6	2.8	1.9	41	1.59	0	156.8	0.98	1.1	1.16	0.8	0.000131	0
7.6	0.2	6.3	2.5	78	1.5	2	157.4	0.95	1.05	0.98	3.4	0.000247	0
7.6	0.162	4.4	1.1	49	2.11	3	61.2	0.97	1.06	1	3	3.45E-06	1
6.93	0.22	3.2	2.7	53	1.85	12	95.8	0.97	1.07	1.05	0.7	2.13E-05	0
6.2	0.351	3.6	2	50	1.9	9	83.5	0.95	1.07	1.1	2.75	0.000015	1
6.93	0.36	8.2	3	102	2.06	20	100.6	0.89	1	1.05	2.7	4.89E-06	0
6.9	0.45	6	2.6	76	2.59	70	80.9	0.93	1.03	1.04	2	1.2E-07	1
6.2	0.339	4.5	2.3	60	2.01	7	35.3	0.93	1.03	1.05	2	6.94E-06	1
6.9	0.6	4	2.5	57	1.91	15	72.8	0.96	1.05	1.03	2	0.000014	1
6.93	0.26	2.6	2.4	45	2.15	5	35.8	0.98	1.05	1.02	1.2	2.61E-06	1
7.6	0.162	5.5	1.7	61	1.84	5	152.1	0.96	1.08	0.98	1	2.28E-05	0
7	0.217	6.1	1.4	70	2.11	26	104.1	0.93	1.04	1.05	4.25	3.45E-06	1
6.9	0.5	3.8	2	50	1.96	20	97.4	0.96	1.07	1.05	2.5	9.85E-06	1
6.93	0.13	4.5	1.8	57	2.06	14	66.6	0.95	1.05	1.03	2.3	4.89E-06	0
6.9	0.6	5.5	2.4	69	2.06	28	91.6	0.94	1.04	1.05	1.3	4.89E-06	1
6.6	0.41	5.9	2.1	72	1.67	5	94.6	0.92	1.04	1.08	1.4	0.000075	0
6.93	0.28	4.7	3	67	2.04	10	58.9	0.95	1.03	1.03	0.6	5.63E-06	1
6.93	0.28	2.2	1	28	1.88	15	71.8	0.98	1.1	1.03	0.6	1.73E-05	1
7	0.234	3.7	0.8	42	1.68	2	117.1	0.97	1.1	1.06	2.65	0.00007	1
7.62	0.6	3	1.1	36	2.16	35	100.1	0.98	1.1	0.99	2	2.43E-06	1

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.88	0.5	2.4	0.8	29	2.07	20	133.2	0.98	1.1	1.11	1.6	4.56E-06	1
7.6	0.18	3.3	2.3	48	1.97	5	52.6	0.98	1.05	1	1.3	9.19E-06	1
6.6	0.43	2.7	0.5	29	1.97	1	56.8	0.97	1.1	1.04	3	9.19E-06	1
6.6	0.27	5.5	1.2	60	1.75	1	79.9	0.93	1.05	1.06	1.4	4.29E-05	1
7.6	0.12	3.3	1	38	2.59	75	72.7	0.98	1.08	0.99	1	1.2E-07	1
7.6	0.16	7.4	2.3	86	1.81	2	72.6	0.94	1.01	0.99	3.3	2.82E-05	0
6.93	0.28	2.6	1.7	38	1.36	4	149.3	0.98	1.1	1.13	0.6	0.000657	0
6.93	0.38	5.2	3.5	79	1.97	18	91.4	0.94	1.02	1.04	3.5	9.19E-06	1
6.6	0.27	4.1	2.4	57	1.85	10	66.6	0.95	1.05	1.05	1	2.13E-05	1
9	0.22	9	1.3	93	1.74	2	99.1	1.01	1.01	0.89	1.2	0.000046	1
6.93	0.4	6.5	6.2	115	1.75	15	163.4	0.92	0.98	1.17	1.2	4.29E-05	0
7.6	0.64	3.4	3	55	2.23	41	112.2	0.98	1.07	0.99	0.8	1.49E-06	1
6.9	0.6	6.5	1.8	75	2.23	41	76.7	0.92	1.03	1.04	5	1.49E-06	1
6.2	0.447	2.8	1	34	1.9	11	116.6	0.97	1.1	1.18	1.1	0.000015	1
6.9	0.6	4.5	1.8	57	2.02	25	107.8	0.95	1.06	1.07	3	6.47E-06	1
7	0.167	7.3	1.3	80	1.85	4	83.8	0.91	1.02	1.03	3	2.13E-05	1
7.6	0.64	2.7	1.5	36	1.79	6	122.3	0.99	1.1	0.99	0.6	3.24E-05	1
6.93	0.36	5.8	4.9	97	2.1	27	75.9	0.93	1	1.03	3	3.7E-06	1
6.2	0.45	2.6	2	40	2.03	18	94.5	0.97	1.09	1.12	1.25	6.04E-06	1
7.62	0.25	6	0.7	61	2.11	32	90.4	0.95	1.05	0.99	3	3.45E-06	1
6.93	0.28	2	1.7	32	1.41	4	161.7	0.99	1.1	1.17	1	0.000463	0
7.6	0.64	4.8	1.1	50	1.84	10	125	0.97	1.09	0.99	1.2	2.28E-05	0
7.51	0.37	1.8	1	25	2.44	16	40.5	0.99	1.09	1	1.2	3.42E-07	1
6.2	0.323	7.3	1.3	80	1.85	4	83.8	0.88	1.02	1.1	3	2.13E-05	1
6.22	0.09	3.5	2.1	49	2.41	64	76.6	0.95	1.06	1.08	1	4.22E-07	0
7.62	0.38	3.5	1	40	2.46	60	72.5	0.98	1.08	0.99	2	2.98E-07	1
9	0.18	4.2	2.5	60	1.77	5	87.3	1.01	1.05	0.92	0.8	3.73E-05	0
7	0.219	5.5	1.4	64	1.62	0	146.3	0.94	1.07	1.11	2	0.000106	0
6.93	0.13	5.3	4.2	86	2.09	30	85.1	0.94	1.02	1.04	2.2	3.97E-06	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.6	0.4	4.2	1.5	51	1.67	15	125.4	0.95	1.09	1.14	1.6	0.000075	0
7.6	0.26	6.6	3.5	89	1.74	2	163.1	0.95	1.02	0.97	1.2	0.000046	0
7.51	0.4	2.2	1.7	34	1.84	12	129.6	0.99	1.1	1	0.9	2.28E-05	1
6.33	0.19	2.9	2	43	2.35	51	80.6	0.97	1.08	1.08	1.8	6.43E-07	1
6.93	0.22	4.7	1.8	59	1.94	10	68.2	0.95	1.04	1.03	2	1.13E-05	1
6.93	0.13	4	1.7	52	2	10	65.9	0.96	1.05	1.03	4.8	7.45E-06	0
6.93	0.28	11	2.4	120	2.24	30	85.9	0.84	0.98	1.04	0.6	1.39E-06	1
6.22	0.133	4.8	1.2	54	2.13	30	120.6	0.93	1.08	1.2	4.4	0.000003	0
6.93	0.28	5.5	2.8	73	2.21	3	24.4	0.94	1.02	1.02	0.6	1.71E-06	1
7	0.211	4.3	1.6	53	1.83	6	67.4	0.96	1.05	1.03	1.5	2.45E-05	1
6.9	0.7	5	2.5	68	1.59	0	163.5	0.94	1.07	1.18	2	0.000131	0
6.93	0.28	3.5	2	48	1.37	4	164.5	0.97	1.1	1.17	1	0.000613	0
6.93	0.24	6.2	5.5	102	2.22	10	112.7	0.93	1	1.07	1.3	1.6E-06	0
7	0.168	8.6	2.4	101	1.95	11	70.4	0.89	1	1.03	3.2	1.06E-05	1
6.6	0.26	4.7	4.4	80	1.58	5	149.9	0.94	1.04	1.22	0.6	0.000141	0
6.93	0.28	3.1	1.9	44	1.38	4	126.8	0.97	1.1	1.09	3	0.000571	0
6.93	0.22	3.5	0.8	39	2.09	24	78.4	0.97	1.09	1.04	4	3.97E-06	1
6.9	0.4	5.5	1.5	62	2.17	36	79.5	0.94	1.04	1.04	3	2.27E-06	1
6.88	0.5	7.3	6.8	124	2.3	20	107.8	0.9	0.98	1.07	1	9.12E-07	1
6.93	0.28	4.1	1.9	53	1.94	15	106.7	0.96	1.07	1.06	0.6	1.13E-05	1
7	0.216	4.8	0.5	50	1.69	0	127.3	0.95	1.09	1.08	1	6.52E-05	1
7.51	0.4	2.3	1	29	2.55	12	28.9	0.99	1.07	1	1	1.58E-07	1
7.51	0.37	1.6	0.5	19	2.32	5	16.1	0.99	1.08	1	1.6	7.93E-07	1
7	0.231	6.5	1.5	74	1.74	3	92.6	0.92	1.03	1.04	3.1	0.000046	1
6.2	0.451	2.4	2	38	1.98	16	100.3	0.97	1.1	1.13	0.85	8.57E-06	1
7.62	0.6	4.5	1.2	51	2.35	14	68.6	0.97	1.06	0.99	1	6.43E-07	1
6.6	0.27	4.4	1.4	51	2.23	5	47	0.95	1.05	1.04	1.8	1.49E-06	0
6.9	0.37	7	2	76	1.74	2	87.3	0.91	1.03	1.04	2	0.000046	1
6.93	0.28	3.5	1.4	43	1.47	4	142.4	0.97	1.1	1.12	1	0.000304	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.93	0.4	8.5	5.6	128	1.97	12	78.9	0.89	0.98	1.04	4	9.19E-06	1
6.93	0.28	6.3	3	84	1.89	3	61.6	0.92	1.01	1.03	1.5	1.61E-05	1
6.93	0.33	7	5.3	112	2.11	13	62	0.91	0.99	1.03	3.6	3.45E-06	1
6.93	0.28	2	1	26	1.88	5	52.8	0.99	1.1	1.02	0.6	1.73E-05	1
7.7	0.17	1.8	0.8	23	2.22	5	37.5	0.99	1.09	0.99	2	1.6E-06	1
6.93	0.28	3.6	1.2	43	1.4	3	116.6	0.97	1.1	1.07	0.6	0.000497	1
6.9	0.65	4.3	2	55	1.65	0	116.7	0.96	1.07	1.08	0.5	8.63E-05	1
7.6	0.162	3.1	1.4	40	2.18	5	51.1	0.98	1.07	1	3	2.11E-06	1
6.93	0.36	6.7	4.9	100	1.83	13	94.1	0.92	1	1.05	2.5	2.45E-05	1
7.51	0.4	3.7	0.4	37	2.13	35	97.7	0.98	1.1	1	0.7	0.000003	1
6.2	0.354	5.8	2	70	1.96	12	71.5	0.91	1.03	1.08	1.9	9.85E-06	1
6.6	0.39	5.5	2.5	71	1.82	5	73	0.93	1.03	1.05	0.9	2.63E-05	1
5.9	0.26	4.8	1.2	54	2.13	30	120.6	0.92	1.08	1.25	4.4	0.000003	1
7.51	0.4	3.8	3.3	63	1.84	35	132.5	0.97	1.07	1	1	2.28E-05	1
6.2	0.186	2.6	1.2	34	1.92	10	73.6	0.97	1.1	1.08	1.1	0.000013	1
7.62	0.25	5	0.6	50	2.39	54	84.2	0.96	1.07	0.99	1	4.86E-07	1
7	0.227	3.6	2	50	1.96	8	60.6	0.97	1.06	1.02	0.95	9.85E-06	1
9	0.21	6.8	1.1	71	1.9	15	101.6	1.01	1.04	0.89	1	0.000015	1
7.51	0.4	2.2	1.5	32	2.36	65	77.2	0.99	1.1	1	0.7	5.99E-07	1
6.53	0.2	3.5	2.1	49	2.41	64	76.6	0.96	1.06	1.06	1	4.22E-07	1
6.9	0.45	4.8	2.1	60	2.06	28	99.8	0.95	1.05	1.06	1.5	4.89E-06	1
6.2	0.453	1.7	1.4	27	2.13	39	89.8	0.98	1.1	1.11	0.6	0.000003	1
7.62	0.25	4.5	0.7	46	2.27	45	99.6	0.97	1.08	0.99	3	1.13E-06	1
7	0.183	4.5	2.3	60	2.01	7	35.3	0.95	1.03	1.02	2	6.94E-06	0
6.2	0.382	3.8	1.8	48	2.15	24	78.7	0.95	1.07	1.09	0.3	2.61E-06	1
6.93	0.22	4.3	2.1	58	1.88	9	75	0.96	1.05	1.03	4.4	1.73E-05	1
6.93	0.18	5.5	3.5	70	2.35	52	76.3	0.94	1.03	1.03	3.5	6.43E-07	1
6.93	0.28	2.5	1.7	37	1.52	4	134.6	0.98	1.1	1.1	1	0.000214	0
7.2	0.6	2.9	3.1	50	2.23	18	54.7	0.98	1.05	1.01	1.2	1.49E-06	1

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.93	0.28	5	1.8	60	1.57	4	114.8	0.94	1.06	1.07	0.6	0.000151	1
6.93	0.12	6.9	6.4	120	2.5	7	36.7	0.91	0.99	1.02	1	2.25E-07	0
6.913205	0.459151	2.71197	1.81197	39	1.488765	1	153.4989	0.98	1.1	1.146795	0.71197	0.000363	0
7.477962	0.26	6.368127	3.609834	87	1.720474	2	161.4891	0.94878	1.022441	1.00051	1.126777	5.76E-05	0
6.915145	0.438457	2.396142	1.799035	36	1.499132	2	159.2736	0.985048	1.079656	1.165048	0.900965	0.000299	0
7.579367	0.16396	5.5	1.689683	61	1.832435	4	151.9005	0.959312	1.1	0.984471	1.034389	2.57E-05	0
6.92728	0.309017	2.072544	1.718136	32	1.426322	3	161.2557	0.989093	1.1	1.169093	0.981864	0.000433	0
6.907763	0.591312	4.767098	2.525878	65	1.527893	0	162.7495	0.945176	1.077763	1.174824	1.637708	0.00028	0
6.919876	0.387993	2.667496	1.767496	39	1.43762	2	151.8311	0.98	1.1	1.140124	0.667496	0.00048	0
6.911711	0.26	5.292251	4.11946	82	1.629874	4	154.0146	0.943117	1.033766	1.142072	0.787027	0.000111	0
7.6	0.228796	6.44398	2.979932	83	1.615184	2	160.1356	0.95	1.035602	0.975201	2.34415	0.00015	0
6.913599	0.482283	3.664013	2	49	1.517612	1	164.828	0.964533	1.1	1.175467	1.164013	0.000328	0
7.489087	0.172537	5.5	1.644544	61	1.799332	4	151.0278	0.956303	1.078151	1.004031	1.184854	3.83E-05	0
7.018249	0.217266	5.5	1.409125	63	1.626691	0	146.4764	0.940608	1.070304	1.106046	1.969585	0.000104	0
6.906746	0.528043	2.957407	1.922487	42	1.540529	0	158.5315	0.977751	1.1	1.162249	0.844973	0.00024	0
6.928185	0.30541	4.154451	2.59395	59	1.36452	0	160.7755	0.95879	1.098185	1.16121	0.684701	0.00067	0
6.926845	0.318914	4.068448	2.536896	58	1.3805	0	161.0733	0.96	1.1	1.162103	0.673621	0.00064	0
6.917937	0.408672	2.32168	1.78042	35	1.482378	2	159.7297	0.985979	1.1	1.165979	0.91958	0.00033	0
6.902344	0.575	2.854688	1.907813	41	1.572812	0	157.4016	0.979219	1.1	1.160781	0.815625	0.000169	0
6.902655	0.617258	3.773452	2	50	1.616107	0	165.0469	0.960885	1.1	1.179115	1.273452	0.000139	0
7.037188	0.602009	5.254778	2.5	69	1.572362	0	162.3045	0.94196	1.06608	1.140803	2.274376	0.000154	0
6.901357	0.681005	4.959295	2.504523	67	1.579145	0	163.3688	0.940905	1.071357	1.179095	1.936682	0.000157	0
6.92024	0.416639	4.392797	2.567467	61	1.428079	0	161.5435	0.953493	1.09024	1.166507	1.055462	0.000518	0
6.91834	0.404377	3.227926	1.961132	45	1.455509	2	161.5072	0.973887	1.1	1.166113	0.922265	0.000426	0
7.418196	0.194019	5.120111	1.944214	60	1.707039	3	154.4065	0.96	1.085427	1.028843	0.89146	0.000208	0
6.93	0.28	3.5	1.965748	47	1.33746	3	170.6141	0.97	1.1	1.181988	0.931495	0.000904	0
6.919297	0.429836	4.421078	2.564325	62	1.435621	0	161.6346	0.952865	1.089297	1.167135	1.099455	0.0005	0
6.921572	0.369899	3.303346	1.540467	42	1.503712	2	146.4455	0.972809	1.1	1.131237	0.943813	0.000256	0
6.916281	0.472068	4.511574	2.55427	63	1.459753	0	161.9262	0.950854	1.086281	1.19146	1.240225	0.000442	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
6.925772	0.332142	4.057723	2.515445	57	1.390868	0	161.2342	0.96	1.1	1.162818	0.698647	0.000618	0
7.062528	0.256659	4.376924	2.421977	59	1.446923	1	158.9187	0.96	1.096044	1.124395	0.679121	0.00057	0
6.674551	0.26	4.841646	4.332904	80	1.591928	4	150.8841	0.940746	1.038509	1.201362	0.64473	0.000134	0
7.590821	0.206557	6.282953	2.5	77	1.50118	1	157.48	0.949869	1.050262	0.982623	3.381642	0.000245	0
7.082596	0.253125	4.418857	2.39502	59	1.4616	1	158.6641	0.96	1.095445	1.119004	0.691102	0.000549	0
6.798716	0.248077	5.017945	4.02244	79	1.564103	4	151.3904	0.941987	1.041987	1.172308	1.156404	0.000162	0
7.003313	0.218685	5.5	1.401657	63	1.621215	0	146.332	0.94011	1.070055	1.109282	1.994478	0.000106	0
6.93	0.28	2.766085	1.644638	38	1.380299	4	148.0267	0.978155	1.1	1.128155	0.673815	0.000592	0
6.93	0.28	2.863828	1.612057	39	1.392246	4	147.2773	0.977069	1.1	1.127069	0.717257	0.000554	0
7.089695	0.564504	5.352291	2.5	70	1.565611	0	161.8469	0.94271	1.06458	1.125801	2.37939	0.000163	0
6.906862	0.526807	2.960111	1.785635	41	1.562552	0	153.5063	0.977713	1.1	1.150851	0.845746	0.000171	0
6.927779	0.303694	3.448169	1.437022	42	1.478885	3	143.4662	0.97074	1.1	1.122962	0.985191	0.000291	0
6.93	0.28	2.215079	1.7	34	1.392077	4	157.255	0.986415	1.1	1.155661	0.856614	0.000533	0
6.926524	0.317078	2.092695	1.723174	33	1.430856	3	161.1322	0.988841	1.1	1.16841	0.976826	0.000425	0
6.904107	0.556193	2.690483	1.872621	39	1.565359	0	157.4708	0.981369	1.1	1.161369	0.827379	0.000177	0
7.6	0.222602	6.413011	2.876702	82	1.590408	2	159.5472	0.95	1.038699	0.976233	2.571256	0.000171	0
7.378298	0.201046	5.036743	1.997808	60	1.67786	3	154.9126	0.96	1.086618	1.039562	0.867641	0.000248	0
6.928093	0.303517	3.519068	2	48	1.387161	3	164.5381	0.969364	1.1	1.170636	1.019068	0.00058	0
7.289018	0.26	6.009134	3.779884	86	1.690243	2	158.995	0.94689	1.02622	1.047746	1.013411	7.55E-05	0
6.925183	0.240489	5.220293	3.782152	79	1.553985	4	152.3389	0.943252	1.043252	1.141956	1.510513	0.000175	0
6.921888	0.380046	3.581118	2	48	1.443006	2	164.6622	0.967296	1.1	1.172704	1.081118	0.000472	0
6.910873	0.515896	3.691267	1.927511	49	1.473276	0	177.8217	0.963624	1.1	1.201747	1.04629	0.000899	0
7.6	0.206767	6.333836	2.612787	79	1.527069	2	158.0429	0.95	1.046616	0.978872	3.151868	0.000224	0
6.914166	0.448891	2.705557	1.805557	39	1.481391	1	153.2584	0.98	1.1	1.145834	0.705557	0.00038	0
6.903588	0.64977	4.892365	2.511959	66	1.561297	0	163.1532	0.942392	1.073588	1.177608	1.832568	0.0002	0
6.886755	0.242795	5.158808	3.855165	79	1.55706	4	152.0507	0.942868	1.042868	1.151179	1.402915	0.000171	0
6.922824	0.356549	2.647843	1.747843	38	1.415019	3	151.0941	0.98	1.1	1.137176	0.647843	0.000531	0
6.960711	0.253238	4.714212	2.073533	61	1.468455	0	154.3263	0.951226	1.086838	1.138064	1.214212	0.000442	0
6.923129	0.364742	4.03129	2.46258	57	1.41642	0	161.6306	0.96	1.1	1.164581	0.760323	0.000565	0

IP1	IP2	IP3	IP4	IP6	IP9	IP10	IP11	IP12	IP14	IP15	IP17	IP18	OP
7.093796	0.230372	5.490073	3.461788	79	1.540496	3	153.6035	0.944938	1.044938	1.101489	1.982628	0.000193	0
6.914318	0.447275	3.134087	1.661366	41	1.532728	1	149.9274	0.975227	1.1	1.140909	0.895453	0.000214	0
6.917174	0.416813	2.685508	1.785508	39	1.458334	2	152.5066	0.98	1.1	1.142826	0.685508	0.000432	0
6.998221	0.220551	5.464413	1.430503	63	1.613137	0	146.6635	0.940508	1.070763	1.111271	1.964413	0.000122	0
6.707891	0.26	4.904994	4.302898	80	1.597263	4	151.3242	0.941079	1.037842	1.193027	0.664735	0.000131	0
7.568571	0.201886	6.249713	2.559715	78	1.502514	2	157.1643	0.949686	1.049686	0.987543	3.311998	0.000243	0
7.23641	0.26	5.90918	3.827231	85	1.681826	3	158.3006	0.946364	1.027272	1.060897	0.981846	8.05E-05	0
6.909431	0.56797	4.71708	2.531436	65	1.514555	0	162.5884	0.946287	1.079431	1.173713	1.559902	0.000312	0
6.914743	0.4936	4.557714	2.549143	63	1.472057	0	162.0749	0.949829	1.084743	1.170171	1.311999	0.000413	0
6.692434	0.26	4.875624	4.31681	80	1.594789	4	151.1201	0.940924	1.038151	1.196892	0.65546	0.000132	0
6.922521	0.359774	3.325495	1.524646	42	1.499915	3	145.9898	0.972493	1.1	1.129972	0.950142	0.000261	0
6.906104	0.599136	10.72168	3.730717	122	1.845585	13	181.5612	0.840346	0.956104	1.241689	1.438963	2.35E-05	0

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