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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

Table 1 The data set of reflectance ratio of 14 inks on coated paper at 100% v/v.

Colorants	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700
Direct Blue 199	0.195	0.274	0.381	0.487	0.587	0.649	0.680	0.697	0.688	0.657	0.609	0.546	0.467	0.378	0.285	0.195	0.123	0.076	0.052	0.041	0.034	0.031	0.031	0.032	0.033	0.034	0.031	0.028	0.029	0.041	0.072
Acid Blue 9	0.110	0.100	0.126	0.245	0.472	0.664	0.739	0.743	0.715	0.661	0.589	0.500	0.399	0.295	0.202	0.131	0.081	0.051	0.036	0.030	0.028	0.026	0.025	0.024	0.024	0.026	0.028	0.037	0.074	0.203	0.406
Acid Magenta 1	0.154	0.191	0.256	0.319	0.337	0.293	0.223	0.160	0.110	0.078	0.061	0.048	0.040	0.038	0.039	0.037	0.036	0.043	0.090	0.261	0.527	0.709	0.798	0.836	0.855	0.864	0.870	0.872	0.874	0.875	0.876
Acid Red 289	0.289	0.332	0.402	0.458	0.479	0.450	0.380	0.291	0.201	0.121	0.074	0.053	0.043	0.037	0.038	0.043	0.064	0.139	0.329	0.572	0.747	0.817	0.843	0.855	0.863	0.867	0.871	0.873	0.873	0.873	0.875
Basacid Red 510	0.176	0.209	0.255	0.288	0.298	0.280	0.239	0.189	0.143	0.111	0.089	0.071	0.062	0.062	0.061	0.059	0.067	0.108	0.222	0.393	0.565	0.675	0.740	0.776	0.801	0.818	0.831	0.840	0.846	0.851	0.855
Basonyl Red 540	0.194	0.212	0.249	0.329	0.425	0.421	0.315	0.191	0.108	0.060	0.037	0.028	0.025	0.023	0.022	0.025	0.036	0.060	0.116	0.326	0.697	0.899	0.955	0.962	0.957	0.939	0.925	0.911	0.900	0.893	0.891
Acid Yellow 23	0.071	0.067	0.066	0.066	0.068	0.072	0.081	0.097	0.123	0.165	0.249	0.391	0.557	0.697	0.782	0.820	0.832	0.834	0.833	0.833	0.832	0.831	0.833	0.836	0.842	0.847	0.854	0.859	0.863	0.867	0.870
Direct Yellow 132	0.038	0.037	0.037	0.037	0.039	0.042	0.048	0.065	0.103	0.179	0.298	0.439	0.574	0.685	0.760	0.805	0.827	0.838	0.843	0.845	0.846	0.845	0.847	0.850	0.854	0.855	0.849	0.847	0.853	0.862	
Direct Yellow 86	0.041	0.037	0.036	0.036	0.037	0.039	0.043	0.051	0.069	0.106	0.172	0.270	0.389	0.514	0.625	0.714	0.775	0.812	0.833	0.844	0.850	0.852	0.856	0.859	0.865	0.869	0.872	0.874	0.875	0.876	0.877
Black (reddish)	0.065	0.062	0.058	0.052	0.046	0.042	0.039	0.037	0.036	0.036	0.036	0.036	0.037	0.038	0.038	0.039	0.038	0.037	0.037	0.036	0.037	0.038	0.040	0.043	0.049	0.060	0.079	0.111	0.160	0.230	0.315
Black (bluish)	0.083	0.077	0.07	0.063	0.058	0.055	0.054	0.055	0.058	0.063	0.066	0.068	0.066	0.062	0.057	0.052	0.047	0.044	0.041	0.039	0.039	0.04	0.042	0.045	0.05	0.056	0.069	0.092	0.132	0.196	0.281
Orange	0.063	0.061	0.061	0.059	0.055	0.048	0.042	0.038	0.034	0.033	0.033	0.034	0.034	0.041	0.071	0.183	0.401	0.621	0.755	0.814	0.837	0.845	0.850	0.854	0.859	0.863	0.865	0.864	0.864	0.868	0.872
Green	0.052	0.053	0.056	0.061	0.069	0.085	0.122	0.204	0.341	0.488	0.589	0.634	0.634	0.608	0.559	0.486	0.391	0.302	0.229	0.168	0.103	0.067	0.057	0.051	0.048	0.044	0.036	0.030	0.030	0.035	0.054
Violet	0.362	0.492	0.666	0.756	0.759	0.700	0.626	0.548	0.469	0.393	0.325	0.255	0.205	0.175	0.144	0.113	0.098	0.102	0.109	0.102	0.095	0.112	0.176	0.311	0.495	0.662	0.769	0.825	0.851	0.863	0.869

Table 2 The data set of reflectance ratio of 14 inks on uncoated paper at 100% v/v.

Colorants	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700
Direct Blue 199	0.204	0.268	0.347	0.415	0.482	0.527	0.547	0.555	0.545	0.523	0.493	0.450	0.396	0.338	0.280	0.224	0.175	0.138	0.114	0.099	0.091	0.088	0.089	0.093	0.098	0.102	0.099	0.095	0.099	0.117	0.145
Acid Blue 9	0.135	0.128	0.148	0.230	0.396	0.578	0.674	0.686	0.657	0.605	0.534	0.453	0.369	0.288	0.219	0.166	0.126	0.094	0.071	0.058	0.052	0.048	0.045	0.043	0.043	0.046	0.053	0.069	0.104	0.185	0.320
Acid Magenta 1	0.163	0.196	0.241	0.278	0.287	0.255	0.207	0.163	0.129	0.106	0.091	0.078	0.069	0.068	0.069	0.067	0.067	0.077	0.118	0.222	0.408	0.580	0.692	0.751	0.787	0.811	0.833	0.854	0.874	0.892	0.906
Acid Red 289	0.285	0.344	0.417	0.465	0.483	0.458	0.394	0.321	0.252	0.189	0.144	0.118	0.102	0.092	0.091	0.100	0.121	0.168	0.261	0.416	0.602	0.725	0.790	0.827	0.853	0.870	0.884	0.894	0.902	0.910	0.917
Basacid Red 510	0.166	0.191	0.218	0.231	0.232	0.219	0.193	0.162	0.135	0.115	0.100	0.089	0.083	0.082	0.082	0.082	0.088	0.108	0.154	0.236	0.361	0.487	0.594	0.670	0.723	0.762	0.794	0.819	0.840	0.859	0.874
Basonyl Red 540	0.194	0.220	0.253	0.299	0.372	0.403	0.356	0.272	0.190	0.134	0.094	0.064	0.051	0.047	0.045	0.043	0.043	0.048	0.063	0.113	0.268	0.506	0.715	0.823	0.870	0.890	0.903	0.909	0.914	0.920	0.926
Acid Yellow 23	0.087	0.084	0.082	0.082	0.083	0.086	0.093	0.106	0.126	0.166	0.253	0.417	0.611	0.742	0.795	0.809	0.810	0.810	0.809	0.811	0.815	0.824	0.839	0.855	0.871	0.883	0.894	0.902	0.909	0.916	0.923
Direct Yellow 132	0.073	0.072	0.074	0.077	0.082	0.088	0.098	0.114	0.142	0.188	0.262	0.368	0.498	0.626	0.718	0.767	0.790	0.799	0.801	0.804	0.807	0.812	0.824	0.838	0.852	0.862	0.866	0.861	0.858	0.869	0.891
Direct Yellow 86	0.068	0.068	0.069	0.072	0.076	0.081	0.088	0.096	0.109	0.129	0.160	0.207	0.275	0.369	0.478	0.581	0.662	0.718	0.757	0.783	0.800	0.814	0.831	0.849	0.866	0.879	0.891	0.900	0.908	0.916	0.922
Black (reddish)	0.102	0.104	0.102	0.096	0.090	0.085	0.080	0.077	0.076	0.076	0.077	0.079	0.081	0.084	0.086	0.087	0.088	0.089	0.089	0.089	0.089	0.094	0.097	0.101	0.107	0.114	0.125	0.138	0.155	0.178	0.206
Black (bluish)	0.110	0.112	0.11	0.105	0.102	0.101	0.102	0.104	0.109	0.115	0.119	0.121	0.119	0.114	0.109	0.103	0.098	0.094	0.091	0.09	0.09	0.092	0.096	0.100	0.106	0.112	0.12	0.131	0.147	0.172	0.207
Orange	0.083	0.085	0.088	0.087	0.083	0.076	0.068	0.062	0.058	0.056	0.058	0.060	0.063	0.073	0.102	0.176	0.314	0.494	0.647	0.737	0.784	0.809	0.831	0.849	0.866	0.880	0.892	0.901	0.909	0.916	0.922
Green	0.105	0.111	0.117	0.123	0.132	0.147	0.173	0.221	0.300	0.400	0.486	0.531	0.534	0.509	0.467	0.412	0.351	0.292	0.242	0.203	0.166	0.140	0.125	0.116	0.111	0.109	0.104	0.096	0.095	0.104	0.122
Violet	0.327	0.429	0.578	0.664	0.672	0.634	0.579	0.516	0.449	0.390	0.338	0.284	0.243	0.219	0.198	0.172	0.154	0.154	0.160	0.157	0.146	0.150	0.180	0.247	0.364	0.520	0.672	0.782	0.847	0.884	0.904

Table 3 The amount of inks used in the gamut simulation, 5 components.

	1	2	3	4	5
1	100	0	0	0	0
2	25	75	0	0	0
3	25	0	75	0	0
4	25	0	0	75	0
5	25	0	0	0	75
6	75	25	0	0	0
7	75	0	25	0	0
8	75	0	0	25	0
9	75	0	0	0	25
10	25	50	25	0	0
11	25	50	0	25	0
12	25	50	0	0	25
13	25	0	50	25	0
14	25	0	50	0	25
15	25	0	0	50	25
16	50	50	0	0	0
17	50	0	50	0	0
18	50	0	0	50	0
19	50	0	0	0	50
20	25	25	50	0	0
21	25	25	0	50	0
22	25	25	0	0	50
23	25	0	25	50	0
24	25	0	25	0	50
25	25	0	0	25	50
26	50	25	25	0	0
27	50	25	0	25	0
28	50	25	0	0	25
29	50	0	25	25	0
30	50	0	25	0	25
31	50	0	0	25	25
32	25	25	25	25	0
33	25	25	25	0	25
34	25	25	0	25	25
35	25	0	25	25	25

	1	2	3	4	5
36	0	100	0	0	0
37	0	25	75	0	0
38	0	25	0	75	0
39	0	25	0	0	75
40	0	75	25	0	0
41	0	75	0	25	0
42	0	75	0	0	25
43	0	25	50	25	0
44	0	25	50	0	25
45	0	25	0	50	25
46	0	50	50	0	0
47	0	50	0	50	0
48	0	50	0	0	50
49	0	25	25	50	0
50	0	25	25	0	50
51	0	25	0	25	50
52	0	50	25	25	0
53	0	50	25	0	25
54	0	50	0	25	25
55	0	25	25	25	25
56	0	0	100	0	0
57	0	0	25	75	0
58	0	0	25	0	75
59	0	0	75	25	0
60	0	0	75	0	25
61	0	0	25	50	25
62	0	0	50	50	0
63	0	0	50	0	50
64	0	0	25	25	50
65	0	0	50	25	25
66	0	0	0	100	0
67	0	0	0	25	75
68	0	0	0	75	25
69	0	0	0	0	100
70	0	0	0	50	50

Table 4 The amount of inks used in the gamut simulation, 6 components.

	1	2	3	4	5	6
1	100	0	0	0	0	0
2	25	75	0	0	0	0
3	25	0	75	0	0	0
4	25	0	0	75	0	0
5	25	0	0	0	75	0
6	25	0	0	0	0	75
7	75	25	0	0	0	0
8	75	0	25	0	0	0
9	75	0	0	25	0	0
10	75	0	0	0	25	0
11	75	0	0	0	0	25
12	25	50	25	0	0	0
13	25	50	0	25	0	0
14	25	50	0	0	25	0
15	25	50	0	0	0	25
16	25	0	50	25	0	0
17	25	0	50	0	25	0
18	25	0	50	0	0	25
19	25	0	0	50	25	0
20	25	0	0	50	0	25
21	25	0	0	0	50	25
22	50	50	0	0	0	0
23	50	0	50	0	0	0
24	50	0	0	50	0	0
25	50	0	0	0	50	0
26	50	0	0	0	0	50
27	25	25	50	0	0	0
28	25	25	0	50	0	0
29	25	25	0	0	50	0
30	25	25	0	0	0	50
31	25	0	25	50	0	0
32	25	0	25	0	50	0
33	25	0	25	0	0	50
34	25	0	0	25	50	0
35	25	0	0	25	0	50
36	25	0	0	0	25	50
37	50	25	25	0	0	0
38	50	25	0	25	0	0
39	50	25	0	0	25	0
40	50	25	0	0	0	25
41	50	0	25	25	0	0
42	50	0	25	0	25	0
43	50	0	25	0	0	25
44	50	0	0	25	25	0
45	50	0	0	25	0	25
46	50	0	0	0	25	25
47	25	25	25	25	0	0
48	25	25	25	0	25	0
49	25	25	25	0	0	25
50	25	25	0	25	25	0
51	25	25	0	25	0	25
52	25	25	0	0	25	25
53	25	0	25	25	25	0
54	25	0	25	25	0	25
55	25	0	25	0	25	25
56	25	0	0	25	25	25
57	0	100	0	0	0	0
58	0	25	75	0	0	0
59	0	25	0	75	0	0
60	0	25	0	0	75	0
61	0	25	0	0	0	75
62	0	75	25	0	0	0
63	0	75	0	25	0	0

	1	2	3	4	5	6
64	0	75	0	0	25	0
65	0	75	0	0	0	25
66	0	25	50	25	0	0
67	0	25	50	0	25	0
68	0	25	50	0	0	25
69	0	25	0	50	25	0
70	0	25	0	50	0	25
71	0	25	0	0	50	25
72	0	50	50	0	0	0
73	0	50	0	50	0	0
74	0	50	0	0	50	0
75	0	50	0	0	0	50
76	0	25	25	50	0	0
77	0	25	25	0	50	0
78	0	25	25	0	0	50
79	0	25	0	25	50	0
80	0	25	0	25	0	50
81	0	25	0	0	25	50
82	0	50	25	25	0	0
83	0	50	25	0	25	0
84	0	50	25	0	0	25
85	0	50	0	25	25	0
86	0	50	0	25	0	25
87	0	50	0	0	25	25
88	0	25	25	25	25	0
89	0	25	25	25	0	25
90	0	25	25	0	25	25
91	0	25	0	25	25	25
92	0	0	100	0	0	0
93	0	0	25	75	0	0
94	0	0	25	0	75	0
95	0	0	25	0	0	75
96	0	0	75	25	0	0
97	0	0	75	0	25	0
98	0	0	75	0	0	25
99	0	0	25	50	25	0
100	0	0	25	50	0	25
101	0	0	25	0	50	25
102	0	0	50	50	0	0
103	0	0	50	0	50	0
104	0	0	50	0	0	50
105	0	0	25	25	50	0
106	0	0	25	25	0	50
107	0	0	25	0	25	50
108	0	0	50	25	25	0
109	0	0	50	25	0	25
110	0	0	50	0	25	25
111	0	0	25	25	25	25
112	0	0	0	100	0	0
113	0	0	0	25	75	0
114	0	0	0	25	0	75
115	0	0	0	75	25	0
116	0	0	0	75	0	25
117	0	0	0	25	50	25
118	0	0	0	50	50	0
119	0	0	0	50	0	50
120	0	0	0	25	25	50
121	0	0	0	50	25	25
122	0	0	0	0	100	0
123	0	0	0	0	25	75
124	0	0	0	0	75	25
125	0	0	0	0	50	50
126	0	0	0	0	0	100

Table 5 The amount of inks used in the gamut simulation, 7 components.

	1	2	3	4	5	6	7
1	100	0	0	0	0	0	0
2	25	75	0	0	0	0	0
3	25	0	75	0	0	0	0
4	25	0	0	75	0	0	0
5	25	0	0	0	75	0	0
6	25	0	0	0	0	75	0
7	25	0	0	0	0	0	75
8	75	25	0	0	0	0	0
9	75	0	25	0	0	0	0
10	75	0	0	25	0	0	0
11	75	0	0	0	25	0	0
12	75	0	0	0	0	25	0
13	75	0	0	0	0	0	25
14	25	50	25	0	0	0	0
15	25	50	0	25	0	0	0
16	25	50	0	0	25	0	0
17	25	50	0	0	0	25	0
18	25	50	0	0	0	0	25
19	25	0	50	25	0	0	0
20	25	0	50	0	25	0	0
21	25	0	50	0	0	25	0
22	25	0	50	0	0	0	25
23	25	0	0	50	25	0	0
24	25	0	0	50	0	25	0
25	25	0	0	50	0	0	25
26	25	0	0	0	50	25	0
27	25	0	0	0	50	0	25
28	25	0	0	0	0	50	25
29	50	50	0	0	0	0	0
30	50	0	50	0	0	0	0
31	50	0	0	50	0	0	0
32	50	0	0	0	50	0	0
33	50	0	0	0	0	50	0
34	50	0	0	0	0	0	50
35	25	25	50	0	0	0	0
36	25	25	0	50	0	0	0
37	25	25	0	0	50	0	0
38	25	25	0	0	0	50	0
39	25	25	0	0	0	0	50
40	25	0	25	50	0	0	0
41	25	0	25	0	50	0	0
42	25	0	25	0	0	50	0
43	25	0	25	0	0	0	50
44	25	0	0	25	50	0	0
45	25	0	0	25	0	50	0
46	25	0	0	25	0	0	50
47	25	0	0	0	25	50	0
48	25	0	0	0	25	0	50
49	25	0	0	0	0	25	50
50	50	25	25	0	0	0	0
51	50	25	0	25	0	0	0
52	50	25	0	0	25	0	0
53	50	25	0	0	0	25	0
54	50	25	0	0	0	0	25
55	50	0	25	25	0	0	0
56	50	0	25	0	25	0	0
57	50	0	25	0	0	25	0
58	50	0	25	0	0	0	25
59	50	0	0	25	25	0	0
60	50	0	0	25	0	25	0
61	50	0	0	25	0	0	25
62	50	0	0	0	25	25	0
63	50	0	0	0	25	0	25
64	50	0	0	0	0	25	25
65	25	25	25	25	0	0	0
66	25	25	25	0	25	0	0
67	25	25	25	0	0	25	0
68	25	25	25	0	0	0	25
69	25	25	0	25	25	0	0
70	25	25	0	25	0	25	0

	1	2	3	4	5	6	7
71	25	25	0	25	0	0	25
72	25	25	0	0	25	25	0
73	25	25	0	0	25	0	25
74	25	25	0	0	0	25	25
75	25	0	25	25	25	0	0
76	25	0	25	25	0	25	0
77	25	0	25	25	0	0	25
78	25	0	25	0	25	25	0
79	25	0	25	0	25	0	25
80	25	0	25	0	0	25	25
81	25	0	0	25	25	25	0
82	25	0	0	25	25	0	25
83	25	0	0	25	0	25	25
84	25	0	0	0	25	25	25
85	0	100	0	0	0	0	0
86	0	25	75	0	0	0	0
87	0	25	0	75	0	0	0
88	0	25	0	0	75	0	0
89	0	25	0	0	0	75	0
90	0	25	0	0	0	0	75
91	0	75	25	0	0	0	0
92	0	75	0	25	0	0	0
93	0	75	0	0	25	0	0
94	0	75	0	0	0	25	0
95	0	75	0	0	0	0	25
96	0	25	50	25	0	0	0
97	0	25	50	0	25	0	0
98	0	25	50	0	0	25	0
99	0	25	50	0	0	0	25
100	0	25	0	50	25	0	0
101	0	25	0	50	0	25	0
102	0	25	0	50	0	0	25
103	0	25	0	0	50	25	0
104	0	25	0	0	50	0	25
105	0	25	0	0	0	50	25
106	0	50	50	0	0	0	0
107	0	50	0	50	0	0	0
108	0	50	0	0	50	0	0
109	0	50	0	0	0	50	0
110	0	50	0	0	0	0	50
111	0	25	25	50	0	0	0
112	0	25	25	0	50	0	0
113	0	25	25	0	0	50	0
114	0	25	25	0	0	0	50
115	0	25	0	25	50	0	0
116	0	25	0	25	0	50	0
117	0	25	0	25	0	0	50
118	0	25	0	0	25	50	0
119	0	25	0	0	25	0	50
120	0	25	0	0	0	25	50
121	0	50	25	25	0	0	0
122	0	50	25	0	25	0	0
123	0	50	25	0	0	25	0
124	0	50	25	0	0	0	25
125	0	50	0	25	25	0	0
126	0	50	0	25	0	25	0
127	0	50	0	25	0	0	25
128	0	50	0	0	25	25	0
129	0	50	0	0	25	0	25
130	0	50	0	0	0	25	25
131	0	25	25	25	25	0	0
132	0	25	25	25	0	25	0
133	0	25	25	25	0	0	25
134	0	25	25	0	25	25	0
135	0	25	25	0	25	0	25
136	0	25	25	0	0	25	25
137	0	25	0	25	25	25	0
138	0	25	0	25	25	0	25
139	0	25	0	25	0	25	25
140	0	25	0	0	25	25	25

	1	2	3	4	5	6	7
141	0	0	100	0	0	0	0
142	0	0	25	75	0	0	0
143	0	0	25	0	75	0	0
144	0	0	25	0	0	75	0
145	0	0	25	0	0	0	75
146	0	0	75	25	0	0	0
147	0	0	75	0	25	0	0
148	0	0	75	0	0	25	0
149	0	0	75	0	0	0	25
150	0	0	25	50	25	0	0
151	0	0	25	50	0	25	0
152	0	0	25	50	0	0	25
153	0	0	25	0	50	25	0
154	0	0	25	0	50	0	25
155	0	0	25	0	0	50	25
156	0	0	50	50	0	0	0
157	0	0	50	0	50	0	0
158	0	0	50	0	0	50	0
159	0	0	50	0	0	0	50
160	0	0	25	25	50	0	0
161	0	0	25	25	0	50	0
162	0	0	25	25	0	0	50
163	0	0	25	0	25	50	0
164	0	0	25	0	25	0	50
165	0	0	25	0	0	25	50
166	0	0	50	25	25	0	0
167	0	0	50	25	0	25	0
168	0	0	50	25	0	0	25
169	0	0	50	0	25	25	0
170	0	0	50	0	25	0	25
171	0	0	50	0	0	25	25
172	0	0	25	25	25	25	0
173	0	0	25	25	25	0	25
174	0	0	25	25	0	25	25
175	0	0	25	0	25	25	25
176	0	0	0	100	0	0	0
177	0	0	0	25	75	0	0
178	0	0	0	25	0	75	0
179	0	0	0	25	0	0	75
180	0	0	0	75	25	0	0
181	0	0	0	75	0	25	0
182	0	0	0	75	0	0	25
183	0	0	0	25	50	25	0
184	0	0	0	25	50	0	25
185	0	0	0	25	0	50	25
186	0	0	0	50	50	0	0
187	0	0	0	50	0	50	0
188	0	0	0	50	0	0	50
189	0	0	0	25	25	50	0
190	0	0	0	25	25	0	50
191	0	0	0	25	0	25	50
192	0	0	0	50	25	25	0
193	0	0	0	50	25	0	25
194	0	0	0	50	0	25	25
195	0	0	0	25	25	25	25
196	0	0	0	0	100	0	0
197	0	0	0	0	25	75	0
198	0	0	0	0	25	0	75
199	0	0	0	0	75	25	0
200	0	0	0	0	75	0	25
201	0	0	0	0	25	50	25
202	0	0	0	0	50	50	0
203	0	0	0	0	50	0	50
204	0	0	0	0	25	25	50
205	0	0	0	0	50	25	25
206	0	0	0	0	0	100	0
207	0	0	0	0	0	25	75
208	0	0	0	0	0	75	25
209	0	0					

VITA

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