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APPENDICES

APPENDIX A

SOUCE CODE PROGRAM

Example of source code program of silk A file name A01_0375_1.xls

```
close all;clear all;clc
namef = 'A01_0375_1.xls';                    %CHANGE FILE NAME
nameFFT = 'FFTA01_0375_1.xls';               %CHANGE SAVE DATA
namelowf = 'lowA01_0375_1.xls';              %CHANGE SAVE DATA
namelowft='TlowA01_0375_1.xls';              %CHANGE SAVE DATA
nameA_DAlowf='olowA01_0375.xls';
nameA_DAlowft='oTlowA01_0375.xls';
m = 2000;                                    %CHANGE SIZE OF ARAY

%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------- Normalize Data ----------
%%%%%%%%%%%%%%%%%%%%%%%%%%

a=load(namef,'xls');
A_min=min(a);
A_metrix=ones(m,1);
A_normal=(A_metrix).*(A_min);
aa=a-A_normal;
plot(aa)
title('Fig:1 Narmalize Data ');

%%%%%%%%%%%%%%%%%%%%%%%%%%
%-------------------------FFT-------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%

fr=m;                                        %Max Frequency (Hz)
n=m;                                         %Resolution Point
xfft=fft(aa,n);
s=abs(xfft);
f=0.1*fr*(0:n/2)/n;
y=s(1:n/2+1);
figure;
plot(f,y);
grid on;
title('Fig:2 Frequency Content of Signal ');
xlabel('Frequency (cycle/mm)');
fid = fopen(nameFFT ,'w');
% Open file, or create new file, for writing; discard existing contents, if any.
f=f';
ff=[f,y];
% fprintf(fid,'%f \t %f \n',f,y);
fprintf(fid,'%f\n',ff);
% Write formatted data to file "Fixed-point notation and New line"
```

```
fclose(fid);
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%
%-------------------------------------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

Fbb=fftshift(xfft);
y=abs(Fbb);
figure
plot(y);
title('Fig:3 Show data of frequency ');

%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------------- Block --------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%

bb=length(xfft);
bb(:)=0;
bb(995:1007)=1; % Select Data
bb(m)=0;
cc=Fbb.*bb';
figure
plot(abs(cc));
title('Fig:4 Cut off data of frequency ');

%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------------- Invert FFT -------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%

MFbbi=ifft(cc);
z=abs(MFbbi);
figure
plot(z);
% hold
% plot(aa)
grid on;
title('Fig:5 Low Frequency Data');
xlabel('Length');
fid = fopen(namelowf ,'w');
% Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', z);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------- Convert to transmitance ----------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

t=10.^(-z);
figure
plot(t);
grid on;
title('Fig:6 Low Frequency Data(Transmittance)');
xlabel('Length');
fid = fopen(namelowft ,'w');
% w = Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', t);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------------- Max-Min ---------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

Min01=min(t(400:700));
Min02=min(t(1000:1200));
Min03=min(t(1400:1800));
Minaverage=((Min01+Min02+Min03)/3);
Max01=max(t(600:800));
Max02=max(t(200:400));
Max03=max(t(600:1000));
Max04=max(t(1800:2000));
Maxaverage=(( Max01+Max02+Max03+Max04)/4);

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%------------------------ MTF ----------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

MTF01=(Maxaverage-Minaverage)/(Maxaverage+Minaverage);
Cw=Maxaverage-Minaverage;
Answer=[Minaverage,
      Maxaverage,
      MTF01,
      Cw]
fid = fopen('ansA01.txt' ,'w');
% w = Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', Answer);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files
```

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%------------ Normalize Density from fig 5 -------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

Alowf=load(namelowf ,'xls');
Alowf_min=min(Alowf);
Alowf_metrix=ones(m,1);
Alowf_normal=(Alowf_metrix).*(Alowf_min);
A_DAlowf=Alowf-Alowf_normal;
% A_DAlowft is normalize of low frequency density
figure
plot(A_DAlowf)
grid on;
title('Fig:7 Narmalize Density of low frequency ');
xlabel('Length');
fid = fopen(nameA_DAlowf ,'w');
% Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', A_DAlowf);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%----------------- Convert to transmitance -----------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

A_DAlowft=10.^(-A_DAlowf);
figure
plot(A_DAlowft);
grid on;
title('Fig:8 Low Frequency Data(Transmittance/normalize)');
xlabel('Length');
fid = fopen(nameA_DAlowf ,'w');
% w = Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', A_DAlowft);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------------- Max-Min ---------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

oMin01=min(A_DAlowft(400:700));
oMin02=min(A_DAlowft(1000:1200));
oMin03=min(A_DAlowft(1400:1800));
Minaverage1=((oMin01+oMin02+oMin03)/3);
```

```
oMax02=max(A_DAlowft(200:400));
oMax03=max(A_DAlowft(600:1000));
oMax04=max(A_DAlowft(1800:2000));
Maxaverage1=((oMax02+oMax03+oMax04)/3);

%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%---------------------- MTF ----------------------------
%%%%%%%%%%%%%%%%%%%%%%%%%%%%

MTF02=(Maxaverage1-Minaverage1)/(Maxaverage1+Minaverage1);
Cw1=Maxaverage1-Minaverage1;
Answer1=[Minaverage1,
      Maxaverage1,
      MTF02,
      Cw1]
fid = fopen('ansA01.txt' ,'w');
% w = Open file, or create new file, for writing; discard existing contents, if any.
fprintf(fid,'%f\n', Answer);
% Write formatted data to file "Fixed-point notation and New line"
fclose(fid);
%Close one or more open files
```

APPENDIX B

Report Fit Curve MTF

Silk A

[Variables]
x = col(1)
y = col(2)
[Parameters]
d = 0.00001 ' {{previous: 0.0783167}}
[Equation]
f= 1/(1+(2*3.14*d*x)^2)^1.5
fit f to y
[Constraints]
d>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.94527733 Rsqr = 0.89354923 Adj Rsqr = 0.89354923

Standard Error of Estimate = 0.1078

	Coefficient		Std. Error	t	P
d	0.0783	0.0081	9.7033	<0.0001	

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	0.6824	0.6824	58.7581	(NAN)
Residual	7	0.0813	0.0116		
Total	7	0.7637	0.1091		

PRESS = 0.1266

Durbin-Watson Statistic = 2.1789

Normality Test: Passed (P = 0.2181)

Constant Variance Test: Failed (P = <0.0001)

Power of performed test with alpha = 0.0500: 0.9789

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	1.0000	0.0000	0.0000	0.0000	0.0000
2	0.9511	0.0489	0.4541	0.4559	0.4285
3	0.9157	0.0345	0.3202	0.3238	0.3021

4	0.8258	0.0618	0.5731	0.5977	0.5680
5	0.7226	-0.1012	-0.9386	-1.0260	-1.0305
6	0.5211	0.0615	0.5707	0.6713	0.6426
7	0.3623	0.1361	1.2626	1.4686	1.6346
8	0.2512	-0.2034	-1.8873	-2.0940	-3.1719

Influence Diagnostics:

Row	**Cook'sDist**		**Leverage**	**DFFITS**
1	0.0000	0.0000	0.0000	
2	0.0017	0.0081	0.0386	
3	0.0024	0.0225	0.0458	
4	0.0313	0.0806	0.1681	
5	0.2050	0.1630	-0.4548	
6	0.1730	0.2774	0.3981	
7	0.7612	0.2609	0.9711	
8	1.0132	0.1877	-1.5247	

95% Confidence:

Row	**Predicted**	**Regr. 5%**	**Regr. 95%**	**Pop. 5%**	**Pop. 95%**
1	1.0000	1.0000	1.0000	0.7452	1.2548
2	0.9511	0.9282	0.9739	0.6952	1.2069
3	0.9157	0.8775	0.9539	0.6580	1.1734
4	0.8258	0.7535	0.8982	0.5609	1.0907
5	0.7226	0.6197	0.8254	0.4477	0.9974
6	0.5211	0.3869	0.6553	0.2331	0.8091
7	0.3623	0.2322	0.4925	0.0762	0.6485
8	0.2512	0.1408	0.3616	0.0265	0.5289

Silk B

[Variables]
x = col(1)
y = col(2)
[Parameters]
d = 0.00001 ' {{previous: 0.0711744}}
[Equation]
f= 1/(1+(2*3.14*d*x)^2)^1.5
fit f to y
[Constraints]
d>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.97125377 Rsqr = 0.94333388 Adj Rsqr = 0.94333388

Standard Error of Estimate = 0.0583

	Coefficient		Std. Error	t	P
d	0.0712	0.0040	17.7256	<0.0001	

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	0.3957	0.3957	116.5306	(NAN)
Residual	7	0.0238	0.0034		
Total	7	0.4195	0.0599		

PRESS = 0.0301

Durbin-Watson Statistic = 1.6505

Normality Test: Passed (P = 0.3876)

Constant Variance Test: Passed (P = 0.7941)

Power of performed test with alpha = 0.0500: 0.9972

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	1.0000	0.0000	0.0000	0.0000	0.0000
2	0.9593	0.0407	0.6986	0.7006	0.6727
3	0.9295	-0.0911	-1.5633	-1.5763	-1.8171
4	0.8524	-0.0648	-1.1112	-1.1477	-1.1793
5	0.7609	-0.0681	-1.1691	-1.2573	-1.3230
6	0.5730	0.0528	0.9059	1.0574	1.0680
7	0.4144	0.0005	0.0089	0.0105	0.0098
8	0.2966	0.0468	0.8038	0.9149	0.9028

Influence Diagnostics:

Row	Cook'sDist		Leverage	DFFITS
1	0.0000	0.0000	0.0000	
2	0.0029	0.0058	0.0514	
3	0.0417	0.0165	-0.2354	
4	0.0879	0.0626	-0.3047	
5	0.2477	0.1355	-0.5237	
6	0.4055	0.2662	0.6432	
7	0.0000	0.2853	0.0062	
8	0.2475	0.2282	0.4909	

95% Confidence:

Row	Predicted	Regr. 5%	Regr. 95%	Pop. 5%	Pop. 95%
1	1.0000	1.0000	1.0000	0.8622	1.1378

2	0.9593	0.9488	0.9698	0.8211	1.0975
3	0.9295	0.9118	0.9472	0.7906	1.0684
4	0.8524	0.8179	0.8868	0.7103	0.9944
5	0.7609	0.7102	0.8116	0.6141	0.9078
6	0.5730	0.5019	0.6441	0.4180	0.7281
7	0.4144	0.3408	0.4880	0.2582	0.5706
8	0.2966	0.2307	0.3624	0.1438	0.4493

Silk C

[Variables]
x = col(1)
y = col(2)
[Parameters]
d = 0.00001 ' {{previous: 0.0873066}}
[Equation]
f= 1/(1+(2*3.14*d*x)^2)^1.5
fit f to y
[Constraints]
d>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.95799492 Rsqr = 0.91775427 Adj Rsqr = 0.91775427

Standard Error of Estimate = 0.0808

	Coefficient		Std. Error	t	P
d	0.0873	0.0067	13.0075	<0.0001	

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	0.5097	0.5097	78.1108	(NAN)
Residual	7	0.0457	0.0065		
Total	7	0.5553	0.0793		

PRESS = 0.0670

Durbin-Watson Statistic = 1.1405

Normality Test: Passed (P = 0.4137)

Constant Variance Test: Passed (P = 0.0588)

Power of performed test with alpha = 0.0500: 0.9902

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	1.0000	0.0000	0.0000	0.0000	0.0000
2	0.9398	0.0602	0.7455	0.7500	0.7240
3	0.8970	-0.0134	-0.1659	-0.1687	-0.1565
4	0.7911	-0.0131	-0.1620	-0.1714	-0.1590
5	0.6742	-0.1442	-1.7849	-1.9929	-2.8052
6	0.4607	-0.0299	-0.3704	-0.4368	-0.4100
7	0.3059	0.0705	0.8723	0.9916	0.9902
8	0.2047	0.1227	1.5187	1.6419	1.9385

Influence Diagnostics:

Row	Cook'sDist		Leverage	DFFITS
1	0.0000	0.0000	0.0000	
2	0.0068	0.0119	0.0794	
3	0.0009	0.0321	-0.0285	
4	0.0035	0.1068	-0.0550	
5	0.9796	0.1978	-1.3932	
6	0.0745	0.2808	-0.2562	
7	0.2873	0.2261	0.5353	
8	0.4551	0.1444	0.7965	

95% Confidence:

Row	Predicted	Regr. 5%	Regr. 95%	Pop. 5%	Pop. 95%
1	1.0000	1.0000	1.0000	0.8090	1.1910
2	0.9398	0.9190	0.9606	0.7476	1.1319
3	0.8970	0.8628	0.9312	0.7030	1.0911
4	0.7911	0.7287	0.8535	0.5901	0.9920
5	0.6742	0.5892	0.7591	0.4651	0.8832
6	0.4607	0.3595	0.5619	0.2446	0.6769
7	0.3059	0.2151	0.3968	0.0944	0.5174
8	0.2047	0.1321	0.2773	0.0004	0.4091

Silk D

[Variables]
x = col(1)
y = col(2)
[Parameters]
d = 0.00001 ' {{previous: 0.0603616}}
[Equation]
f= 1/(1+(2*3.14*d*x)^2)^1.5
fit f to y

[Constraints]
d>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.88703680 Rsqr = 0.78683428 Adj Rsqr = 0.78683428

Standard Error of Estimate = 0.1200

	Coefficient		Std. Error	t	P
d	0.0604	0.0066	9.1887	<0.0001	

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	0.4253	0.4253	29.5295	(NAN)
Residual	8	0.1152	0.0144		
Total	8	0.5405	0.0676		

PRESS = 0.1355

Durbin-Watson Statistic = 1.7303

Normality Test: Failed (P = 0.0103)

Constant Variance Test: Passed (P = 0.5804)

Power of performed test with alpha = 0.0500: 0.9317

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	1.0000	0.0000	0.0000	0.0000	0.0000
2	0.9704	0.0296	0.2463	0.2467	0.2316
3	0.9484	0.0044	0.0364	0.0365	0.0342
4	0.8899	-0.3081	-2.5677	-2.6109	-6.3513
5	0.8176	-0.0490	-0.4082	-0.4252	-0.4023
6	0.6569	0.0043	0.0357	0.0397	0.0372
7	0.5060	0.1294	1.0781	1.2465	1.2989
8	0.3824	0.0106	0.0883	0.1014	0.0949
9	0.2880	-0.0100	-0.0829	-0.0924	-0.0865

Influence Diagnostics:

Row	Cook'sDist		Leverage	DFFITS
1	0.0000	0.0000	0.0000	
2	0.0002	0.0027	0.0121	
3	0.0000	0.0080	0.0031	

4	0.2314	0.0328	-1.1703
5	0.0153	0.0782	-0.1171
6	0.0004	0.1905	0.0180
7	0.5233	0.2519	0.7538
8	0.0033	0.2415	0.0535
9	0.0021	0.1943	-0.0425

95% Confidence:

Row	Predicted	Regr. 5%	Regr. 95%	Pop. 5%	Pop. 95%
1	1.0000	1.0000	1.0000	0.7233	1.2767
2	0.9704	0.9559	0.9849	0.6933	1.2476
3	0.9484	0.9236	0.9732	0.6706	1.2263
4	0.8899	0.8398	0.9401	0.6087	1.1712
5	0.8176	0.7402	0.8950	0.5302	1.1049
6	0.6569	0.5361	0.7777	0.3550	0.9589
7	0.5060	0.3671	0.6449	0.1964	0.8157
8	0.3824	0.2464	0.5184	0.0741	0.6908
9	0.2880	0.1660	0.4099	-0.0145	0.5904

Report Fit Curve Yule-Nielsen Equation

Silk A

[Variables]
x = col(1)
y = col(2)
[Parameters]
n = 1.2 ' {{previous: 1.64482}}
[Equation]
f=-n*log (1 - x * (1 - 10^(-2.71 / n)))
fit f to y
[Constraints]
n>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.99930195 Rsqr = 0.99860438 Adj Rsqr = 0.99860438

Standard Error of Estimate = 0.0281

	Coefficient		Std. Error	t	P
n	1.6448	0.0266	61.9243	<0.0001	

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	7.3326	7.3326	9301.8891	(NAN)
Residual	13	0.0102	0.0008		
Total	13	7.3429	0.5648		

PRESS = 0.0200

Durbin-Watson Statistic = 2.1066

Normality Test: Failed (P = 0.0036)

Constant Variance Test: Passed (P = 0.3158)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0358	0.0142	0.5059	0.5060	0.4910

3	0.0735	0.0065	0.2323	0.2324	0.2238
4	0.1133	0.0067	0.2400	0.2404	0.2315
5	0.1554	0.0046	0.1642	0.1647	0.1584
6	0.2002	-0.0002	-0.0058	-0.0058	-0.0056
7	0.2479	0.0121	0.4300	0.4335	0.4196
8	0.3543	-0.0043	-0.1518	-0.1543	-0.1484
9	0.4792	0.0108	0.3833	0.3950	0.3818
10	0.6308	-0.0008	-0.0291	-0.0307	-0.0295
11	0.8235	-0.0535	-1.9046	-2.0740	-2.4359
12	1.0881	-0.0481	-1.7129	-1.9740	-2.2664
13	1.5130	0.0670	2.3851	3.0031	5.2134
14	2.7100	0.0000	0.0000	0.0000	0.0000

Influence Diagnostics:

Row	**Cook'sDist**		**Leverage**	**DFFITS**
1	0.0000	0.0000	0.0000	
2	0.0001	0.0004	0.0092	
3	0.0001	0.0015	0.0086	
4	0.0002	0.0035	0.0137	
5	0.0002	0.0065	0.0128	
6	0.0000	0.0107	-0.0006	
7	0.0031	0.0163	0.0540	
8	0.0008	0.0327	-0.0273	
9	0.0096	0.0582	0.0949	
10	0.0001	0.0973	-0.0097	
11	0.7992	0.1567	-1.0500	
12	1.2787	0.2471	-1.2983	
13	5.2788	0.3692	3.9887	
14	0.0000	0.0000	0.0000	

95% Confidence:

Row	**Predicted**	**Regr. 5%**	**Regr. 95%**	**Pop. 5%**	**Pop. 95%**
1	0.0000	0.0000	0.0000	-0.0607	0.0607
2	0.0358	0.0347	0.0369	-0.0249	0.0965
3	0.0735	0.0712	0.0758	0.0128	0.1342
4	0.1133	0.1097	0.1168	0.0525	0.1740
5	0.1554	0.1505	0.1603	0.0945	0.2162
6	0.2002	0.1939	0.2064	0.1392	0.2611
7	0.2479	0.2402	0.2557	0.1868	0.3091
8	0.3543	0.3433	0.3652	0.2926	0.4159
9	0.4792	0.4646	0.4939	0.4168	0.5416
10	0.6308	0.6119	0.6497	0.5673	0.6944
11	0.8235	0.7995	0.8475	0.7582	0.8887
12	1.0881	1.0579	1.1182	1.0204	1.1558
13	1.5130	1.4762	1.5499	1.4421	1.5840
14	2.7100	2.7100	2.7100	2.6493	2.7707

Silk B

[Variables]
x = col(1)
y = col(2)
[Parameters]
n = 1.2 ' {{previous: 1.6436}}
[Equation]
f=-n*log (1 - x * (1 - 10^(-2.62 / n)))
fit f to y
[Constraints]
n>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.99913620 Rsqr = 0.99827314 Adj Rsqr = 0.99827314

Standard Error of Estimate = 0.0304

	Coefficient	Std. Error	t	P
n	1.6436	0.0297	55.2943	<0.0001

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	6.9512	6.9512	7515.1172	(NAN)
Residual	13	0.0120	0.0009		
Total	13	6.9632	0.5356		

PRESS = 0.0232

Durbin-Watson Statistic = 2.0895

Normality Test: Failed (P = 0.0084)

Constant Variance Test: Passed (P = 0.1050)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0357	0.0043	0.1428	0.1428	0.1373
3	0.0732	0.0068	0.2239	0.2241	0.2157
4	0.1128	0.0072	0.2365	0.2370	0.2281
5	0.1548	-0.0048	-0.1562	-0.1568	-0.1508

6	0.1993	0.0007	0.0225	0.0226	0.0217
7	0.2468	0.0032	0.1036	0.1045	0.1004
8	0.3526	-0.0026	-0.0860	-0.0875	-0.0841
9	0.4768	0.0232	0.7620	0.7860	0.7737
10	0.6273	-0.0073	-0.2399	-0.2529	-0.2435
11	0.8182	-0.0582	-1.9138	-2.0872	-2.4593
12	1.0796	-0.0496	-1.6305	-1.8802	-2.1171
13	1.4963	0.0737	2.4230	3.0267	5.3513
14	2.6200	-0.0000	-0.0000	-0.0000	-0.0000

Influence Diagnostics:

Row	**Cook'sDist**		**Leverage**	**DFFITS**
1	0.0000	0.0000	0.0000	
2	0.0000	0.0004	0.0026	
3	0.0001	0.0015	0.0084	
4	0.0002	0.0036	0.0137	
5	0.0002	0.0068	-0.0124	
6	0.0000	0.0111	0.0023	
7	0.0002	0.0169	0.0132	
8	0.0003	0.0337	-0.0157	
9	0.0394	0.0600	0.1954	
10	0.0071	0.0997	-0.0810	
11	0.8257	0.1593	-1.0706	
12	1.1655	0.2479	-1.2156	
13	5.1335	0.3591	4.0058	
14	0.0000	0.0000	-0.0000	

95% Confidence:

Row	**Predicted**	**Regr. 5%**	**Regr. 95%**	**Pop. 5%**	**Pop. 95%**
1	0.0000	0.0000	0.0000	-0.0657	0.0657
2	0.0357	0.0344	0.0369	-0.0301	0.1014
3	0.0732	0.0706	0.0758	0.0074	0.1389
4	0.1128	0.1089	0.1168	0.0470	0.1786
5	0.1548	0.1494	0.1602	0.0888	0.2207
6	0.1993	0.1924	0.2062	0.1332	0.2654
7	0.2468	0.2383	0.2554	0.1806	0.3131
8	0.3526	0.3405	0.3647	0.2858	0.4194
9	0.4768	0.4607	0.4929	0.4092	0.5445
10	0.6273	0.6066	0.6480	0.5584	0.6962
11	0.8182	0.7920	0.8444	0.7475	0.8889
12	1.0796	1.0469	1.1123	1.0062	1.1530
13	1.4963	1.4569	1.5357	1.4197	1.5729
14	2.6200	2.6200	2.6200	2.5543	2.6857

Silk C

[Variables]
x = col(1)
y = col(2)
[Parameters]
n = 1.2 ' {{previous: 1.6881}}
[Equation]
f=-n*log (1 - x * (1 - 10^(-2.55 / n)))
fit f to y
[Constraints]
n>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.99911328 Rsqr = 0.99822735 Adj Rsqr = 0.99822735

Standard Error of Estimate = 0.0302

	Coefficient	Std. Error	t	P
n	1.6881	0.0313	54.0169	<0.0001

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	6.6807	6.6807	7320.6722	(NAN)
Residual	13	0.0119	0.0009		
Total	13	6.6925	0.5148		

PRESS = 0.0221

Durbin-Watson Statistic = 2.0867

Normality Test: Failed (P = 0.0354)

Constant Variance Test: Passed (P = 0.1013)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0364	0.0136	0.4497	0.4498	0.4355
3	0.0747	0.0053	0.1743	0.1745	0.1678
4	0.1152	-0.0052	-0.1710	-0.1713	-0.1648
5	0.1580	0.0020	0.0676	0.0678	0.0651

6	0.2034	-0.0034	-0.1128	-0.1134	-0.1090
7	0.2519	0.0081	0.2695	0.2720	0.2621
8	0.3596	0.0104	0.3452	0.3515	0.3393
9	0.4859	0.0241	0.7982	0.8246	0.8139
10	0.6386	-0.0086	-0.2843	-0.3003	-0.2895
11	0.8317	-0.0517	-1.7112	-1.8713	-2.1033
12	1.0946	-0.0546	-1.8072	-2.0855	-2.4563
13	1.5084	0.0716	2.3700	2.9213	4.7886
14	2.5500	0.0000	0.0000	0.0000	0.0000

Influence Diagnostics:

Row	**Cook'sDist**		**Leverage**	**DFFITS**
1	0.0000	0.0000	0.0000	
2	0.0001	0.0004	0.0086	
3	0.0000	0.0016	0.0068	
4	0.0001	0.0039	-0.0103	
5	0.0000	0.0072	0.0055	
6	0.0002	0.0118	-0.0119	
7	0.0014	0.0179	0.0354	
8	0.0046	0.0357	0.0653	
9	0.0457	0.0630	0.2110	
10	0.0104	0.1038	-0.0985	
11	0.6859	0.1638	-0.9309	
12	1.4426	0.2491	-1.4146	
13	4.4324	0.3418	3.4510	
14	0.0000	0.0000	0.0000	

95% Confidence:

Row	**Predicted**	**Regr. 5%**	**Regr. 95%**	**Pop. 5%**	**Pop. 95%**
1	0.0000	0.0000	0.0000	-0.0653	0.0653
2	0.0364	0.0351	0.0377	-0.0289	0.1017
3	0.0747	0.0721	0.0774	0.0094	0.1400
4	0.1152	0.1111	0.1192	0.0498	0.1806
5	0.1580	0.1524	0.1635	0.0925	0.2235
6	0.2034	0.1963	0.2105	0.1378	0.2691
7	0.2519	0.2431	0.2606	0.1860	0.3177
8	0.3596	0.3472	0.3719	0.2932	0.4260
9	0.4859	0.4695	0.5023	0.4186	0.5532
10	0.6386	0.6176	0.6596	0.5700	0.7072
11	0.8317	0.8053	0.8581	0.7613	0.9021
12	1.0946	1.0620	1.1272	1.0217	1.1675
13	1.5084	1.4702	1.5466	1.4328	1.5840
14	2.5500	2.5500	2.5500	2.4847	2.6153

Silk D

[Variables]
x = col(1)
y = col(2)
[Parameters]
n = 1.2 ' {{previous: 1.63634}}
[Equation]
f=-n*log (1 - x * (1 - 10^(-2.69 / n)))
fit f to y
[Constraints]
n>0
[Options]
tolerance=0.000100
stepsize=0.1
iterations=100

R = 0.99919485 Rsqr = 0.99839035 Adj Rsqr = 0.99839035

Standard Error of Estimate = 0.0301

	Coefficient	Std. Error	t	P
n	1.6363	0.0285	57.4322	<0.0001

Analysis of Variance:

	DF	SS	MS	F	P
Regression	0	7.2820	7.2820	8063.2648	(NAN)
Residual	13	0.0117	0.0009		
Total	13	7.2937	0.5611		

PRESS = 0.0232

Durbin-Watson Statistic = 2.0810

Normality Test: Passed (P = 0.0530)

Constant Variance Test: Passed (P = 0.1294)

Power of performed test with alpha = 0.0500: 1.0000

Regression Diagnostics:

Row	Predicted	Residual	Std. Res.	Stud. Res.	Stud. Del. Res.
1	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0356	0.0144	0.4791	0.4792	0.4645
3	0.0731	0.0069	0.2301	0.2303	0.2217
4	0.1127	-0.0027	-0.0883	-0.0884	-0.0850
5	0.1546	-0.0046	-0.1516	-0.1521	-0.1463

6	0.1991	-0.0091	-0.3023	-0.3039	-0.2931
7	0.2466	0.0034	0.1134	0.1144	0.1099
8	0.3523	-0.0123	-0.4108	-0.4177	-0.4040
9	0.4766	0.0134	0.4448	0.4583	0.4440
10	0.6274	-0.0074	-0.2452	-0.2581	-0.2486
11	0.8189	-0.0589	-1.9608	-2.1354	-2.5463
12	1.0820	-0.0420	-1.3970	-1.6100	-1.7288
13	1.5042	0.0758	2.5218	3.1736	6.4241
14	2.6900	0.0000	0.0000	0.0000	0.0000

Influence Diagnostics:

Row	**Cook'sDist**		**Leverage**	**DFFITS**
1	0.0000	0.0000	0.0000	
2	0.0001	0.0004	0.0087	
3	0.0001	0.0015	0.0085	
4	0.0000	0.0035	-0.0050	
5	0.0002	0.0065	-0.0118	
6	0.0010	0.0107	-0.0305	
7	0.0002	0.0163	0.0142	
8	0.0059	0.0327	-0.0743	
9	0.0130	0.0583	0.1105	
10	0.0072	0.0974	-0.0817	
11	0.8484	0.1569	-1.0983	
12	0.8509	0.2471	-0.9905	
13	5.8783	0.3686	4.9078	
14	0.0000	0.0000	0.0000	

95% Confidence:

Row	**Predicted**	**Regr. 5%**	**Regr. 95%**	**Pop. 5%**	**Pop. 95%**
1	0.0000	0.0000	0.0000	-0.0649	0.0649
2	0.0356	0.0344	0.0368	-0.0293	0.1005
3	0.0731	0.0706	0.0756	0.0081	0.1381
4	0.1127	0.1088	0.1165	0.0476	0.1777
5	0.1546	0.1493	0.1598	0.0894	0.2197
6	0.1991	0.1924	0.2058	0.1338	0.2644
7	0.2466	0.2383	0.2549	0.1811	0.3120
8	0.3523	0.3406	0.3641	0.2864	0.4183
9	0.4766	0.4610	0.4923	0.4098	0.5434
10	0.6274	0.6071	0.6476	0.5594	0.6954
11	0.8189	0.7932	0.8446	0.7491	0.8888
12	1.0820	1.0497	1.1143	1.0095	1.1545
13	1.5042	1.4648	1.5436	1.4283	1.5802
14	2.6900	2.6900	2.6900	2.6251	2.7549

APPENDIX C

Sharpness of Printed Silk

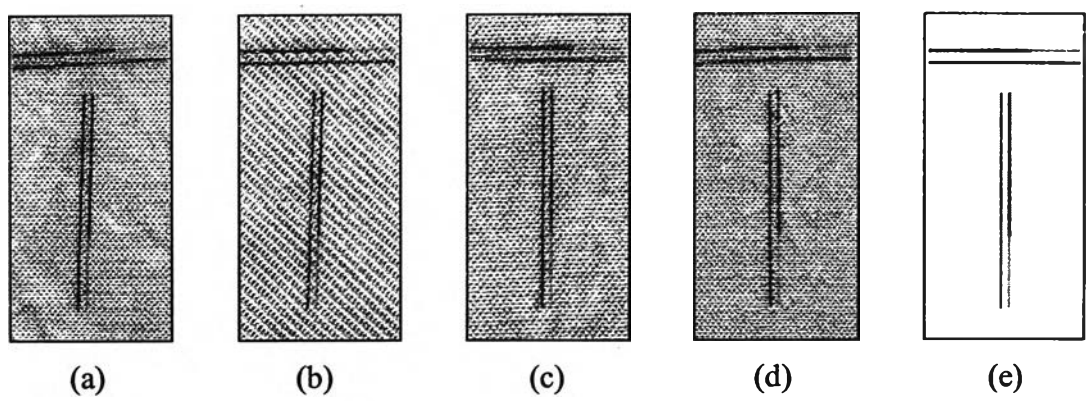

Figure C.1 Images of vertical and horizontal line 1 mm to printed on (a) silk A, (b) silk B, (c) silk C, (d) silk D, and (e) paper

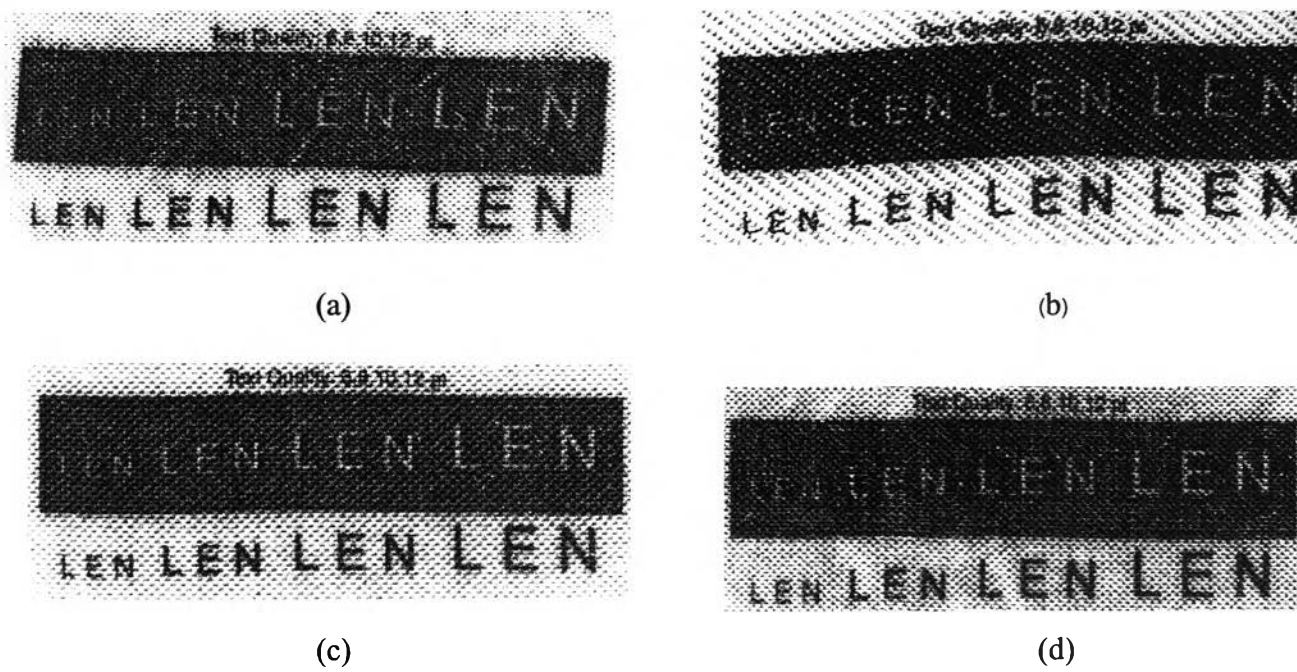

Figure C.2 Images of the text quality by 6-12 pt characters printed on (a) silk A, (b) silk B, (c) silk C, and (d) silk D

APPENDIX D

Table B.1 Surface tension of cyan, magenta, yellow, and black inkjet inks at room temperature

Inkjet Ink Color	Surface Tension (mN m^{-1})
Cyan	51.83 ± 0.21
Magenta	50.60 ± 1.21
Yellow	48.00 ± 0.10
Black	51.80 ± 0.10

VITA

Miss Apinya Janasak was born on April 27, 1980 in Lampang, Thailand. She graduated with a Bachelor of Science Degree in Industrial Chemistry Department, from the Faculty of Science, King Mongkut Institute of Technology Ladkrabang in 2001. She has pursued the Master of Science Degree in Imaging Technology Program, Faculty of Science, Chulalongkorn University since 2002 and finished her study in August 2005.