

```

1  %clf;
2
3  clc;
4  clear;
5  lambda = 0.24;
6  A = 0.44;
7  P = 1;
8  W = P / 2;
9  n = 1000;
10 nlim = floor(2*A/lambda);
11 k = nlim;
12 counter = 0;
13
14 while (counter / P *lambda / (2 * A) <= 1)
15     counter = counter + 1;
16 end
17
18
19 stepper = 0:(counter - 1);
20 R = stepper / P *lambda / (2 * A);
21
22 T = 2 / pi * (acos(R) - R.*sqrt(1-R.^2));
23 %FIG1
24 figure(1);
25 %FIG1
26 clf;
27 hold on;
28 grid on;
29 xlabel('x');
30 ylabel('I_0');
31 axis([-P/2 P/2 -0.2 1.2]);
32 X = -P / 2:P/100:P / 2;
33     Y = sin(X*2*pi/P);
34     Y(find(Y >= 0)) = 1;
35     Y(find(Y < 0)) = 0;
36     axis([-P/2 P/2 -0.2 1.2]);
37 plot(X,Y);
38 axis([-P/2 P/2 -0.2 1.2]);
39 filename_fig1 = "fig1-0.pdf";
40 print (figure(1), filename_fig1);
41 a0 = 0.5;
42 b1 = integral(@(x) 2/P*sin(2*pi*x/P), 0, P/2);
43
44 f = cell(k,1);
45 f{1,1} = @(x) (b1.*sin(2*pi*x/P));
46
47
48 checker = 2;
49
50 j = 1;
51 j_val = [j+1];
52 while(checker <= k)
53     j = j + 1;
54     bi = integral(@(x) 2/P*sin(2*pi*j*x/P), 0, P/2);
55     if (bi > 10^(-5))
56         f{checker,1} = @(x) (bi*sin(2*pi*j*x/P));
57         checker = checker + 1;
58         j_val = [j_val j+1];
59     else
60         continue
61     end
62 end
63 %FIG1
64 figure(1);
65 %FIG1
66 xlabel('x');
67 ylabel('I_0');
68
69 sum_func = @(x) 0;

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70 for i = 1:k
71     hold on;
72     grid on;
73     buf = @(x) f{i}(x);
74     sum_func = @(x) sum_func(x) + buf(x);
75     plot(X, (buf(X) + a0));
76     filename_fig = strcat("fig1-", int2str(i));
77     filename_fig1 = strcat(filename_fig, ".pdf");
78     print (figure(1), filename_fig1);
79     pause(0.5);
80 end
81
82 plot(X, sum_func(X)+a0);
83
84 filename_fig = strcat("fig1-", int2str(k+1));
85 filename_fig1 = strcat(filename_fig, ".pdf");
86 print (figure(1), filename_fig1);
87
88 %FIG2
89 figure(2);
90 %FIG2
91
92 fsum = @(x) a0;
93 if (counter > k)
94     ki = k;
95 else
96     ki = counter - 1;
97 end
98 clf;
99 for i = 1:k
100     hold on;
101     grid on;
102     xlabel('x');
103     ylabel('I_0');
104     Y = sin(X*2*pi/P);
105     Y(find(Y >= 0)) = 1;
106     Y(find(Y < 0)) = 0;
107     axis([-P/2 P/2 0 1.2]);
108     plot(X,Y);
109     fsum = @(x) fsum(x) + T(i+1)*f{i}(x);
110     axis([-P/2 P/2 0 1.2]);
111     plot (X, fsum(X));
112     filename_fig = strcat("fig2-",int2str(i));
113     filename_fig2 = strcat(filename_fig, ".pdf");
114     print (figure(2), filename_fig2);
115     pause(0.5);
116 end
117
118 fprintf("Max contrast = %d\n", max(fsum(X)));
119 fprintf("Min contrast = %d\n", min(fsum(X)));
120 contrast_ratio = (max(fsum(X)) - min(fsum(X))) / (max(fsum(X)) + min(fsum(X)));
121 fprintf("Contrast ratio = %d\n", contrast_ratio);
122
123
124 %FIG3
125 figure(3);
126 %FIG3
127 clf;
128 grid on;
129 plot(R,T);
130 grid on;
131 xlabel('R');
132 ylabel('T');
133 axis([0 0.8 0 1]);
134 filename_fig3 = "fpm.pdf";
135 print (figure(3), filename_fig3);
136
137

```