```
% Grey Evaluation
% by A.Beltrami

% Read the grey definition axis
GreyScale=[15; 30; 50; 70; 85];
n=size(GreyScale,1);
GreyAxis=zeros(n,8);
T = readtable('FOGRA51_GreyAxis.txt',"FileType","text")
```

T = 15×8 table

	SAMPLE_NAME	CMYK_C	CMYK_M	CMYK_Y	CMYK_K	LAB_L	LAB_A	LAB_B
1	5	3.5294	2.7451	2.7451	0	92.1952	1.5078	-5.7617
2	10	7.4510	5.4902	5.4902	0	89.2417	1.3594	-5.6602
3	15	11.7647	8.6275	8.2353	0	85.9298	1.3320	-5.6562
4	20	15.6863	11.3725	10.9804	0	82.9733	1.1914	-5.4414
5	25	20.0000	14.5098	14.1176	0	79.6921	1.1016	-5.1602
6	30	23.9216	17.6471	17.2549	0	76.6238	1.0859	-4.8516
7	40	32.5490	24.7059	23.9216	0	69.9096	1.1094	-4.5469
8	50	41.5686	32.5490	31.7647	0	62.8661	1.0039	-3.8945
9	60	51.3725	41.9608	40.3922	0	55.2466	1.1211	-3.5547
10	70	62.3529	52.9412	51.3725	0	46.9225	0.8125	-2.8594
11	75	68.2353	59.6078	57.6471	0	42.3698	0.9141	-2.6914
12	80	74.5098	66.6667	65.0980	0	37.5919	0.7344	-2.2734
13	85	81.5686	76.0784	74.1176	0	32.2855	0.8672	-2.1875
14	90	90.5882	88.6275	86.2745	0	26.7907	0.8594	-1.8984

⋮

```
for i=1:n
    GreyAxis(i,:)=T(T.SAMPLE_NAME==GreyScale(i),:).Variables;
end

% Prepare arrays
n=size(GreyScale,1);
GreyReproduction=zeros(n,3);
DeltaE=zeros(n,1);
DeltaCh=zeros(n,1);
DeltaHab=zeros(n,1);
```

```
% Load measures

% fileName="TVI Calibrated.txt";
fileName="GreyFinder Calibrated.txt";

% Read CGATS files and extract L,a,b
```

```
meas = fopen(fileName);
line = '';
while strcmp(line,'BEGIN_DATA')==0
    line=fgetl(meas);
end
% Calculate the index pf the five central patches
GreyScaleIndex=[round(7*7/2), 7*7+round(13*13/2), 7*7+13*13+round(13*13/2), 7*7+13*13*2+round(1
```

```
GreyScaleIndex = 1×5
    25   134   303   472   581
```

```
i=1;
while strcmp(line,'END_DATA')==0 && i<=n
    line=fgetl(meas);
    if strcmp(line,'END_DATA')
        break;
    end
    line=replace(line,',','.');
    values=textscan(line,'%d %s %f %f %f %*[^\n]'); %ID, NAME, L, a, b, 36*spectrum
    % Extract Lab of the five central patches
    if values{1}(1)==GreyScaleIndex(i)
        GreyReproduction(i,1)=values{3}; %L
        GreyReproduction(i,2)=values{4}; %a
        GreyReproduction(i,3)=values{5}; %b
        i=i+1;
    end
end
```

```
% Calc Deltas
for i=1:n
    Lab1=GreyAxis(i,6:8);
    Lab2=GreyReproduction(i,:);
    DeltaE(i)=DE00(Lab1,Lab2);
    DeltaCh(i)=DCh(Lab1,Lab2);
    DeltaHab(i)=DHab(Lab1,Lab2);
end
% Calc the GI_H (Gray Index based on DH)
GI=mean(DeltaCh)*(std(DeltaHab)+1);
```

```
% Write the resulting table
G = table(GreyAxis(:,1),GreyAxis(:,2),GreyAxis(:,3),GreyAxis(:,4),GreyAxis(:,5),...
    GreyAxis(:,6),GreyAxis(:,7),GreyAxis(:,8),GreyReproduction(:,1),GreyReproduction(:,2),GreyR
    DeltaE,DeltaCh,DeltaHab,...
    'VariableNames',{'SAMPLE_NAME','CMYK_C','CMYK_M','CMYK_Y','CMYK_K',...
    'REF_LAB_L','REF_LAB_A','REF_LAB_B','LAB_L','LAB_A','LAB_B',...
    'DE00','DCh','DHab'})
```

```
G = 5×14 table
```

...

	SAMPLE_NAME	CMYK_C	CMYK_M	CMYK_Y	CMYK_K	REF_LAB_L	REF_LAB_A
1	15	11.7647	8.6275	8.2353	0	85.9298	1.3320

	SAMPLE_NAME	CMYK_C	CMYK_M	CMYK_Y	CMYK_K	REF_LAB_L	REF_LAB_A
2	30	23.9216	17.6471	17.2549	0	76.6238	1.0859
3	50	41.5686	32.5490	31.7647	0	62.8661	1.0039
4	70	62.3529	52.9412	51.3725	0	46.9225	0.8125
5	85	81.5686	76.0784	74.1176	0	32.2855	0.8672

```
writetable(G,replace(fileName,'.txt','.stat.txt'),'FileType',"text");
```

```
% Plot the target grey axis vs. the calculated grey axis
fig=figure;
p=plot(GreyAxis(:,7), GreyAxis(:,6), GreyAxis(:,8), GreyAxis(:,6),...
    GreyReproduction(:,2), GreyReproduction(:,1), GreyReproduction(:,3), GreyReproduction(:,1))
title(sprintf('FOGRA51 Grey Axis adj. vs. %s',replace(replace(fileName,'_','\_'),'.txt','')));
p(1).Color='#777777';
p(2).Color='#777777';
p(3).Color='r';
p(4).Color='b';
xlabel('a^* (red), b^* (blue)');
ylabel('L^*');
xlim([-8 3]);
ylim([30 90]);
grid on
text(-2,75,sprintf("GI: %.2f",GI));

saveas(fig,replace(fileName,'.txt','.png'),'png');
```