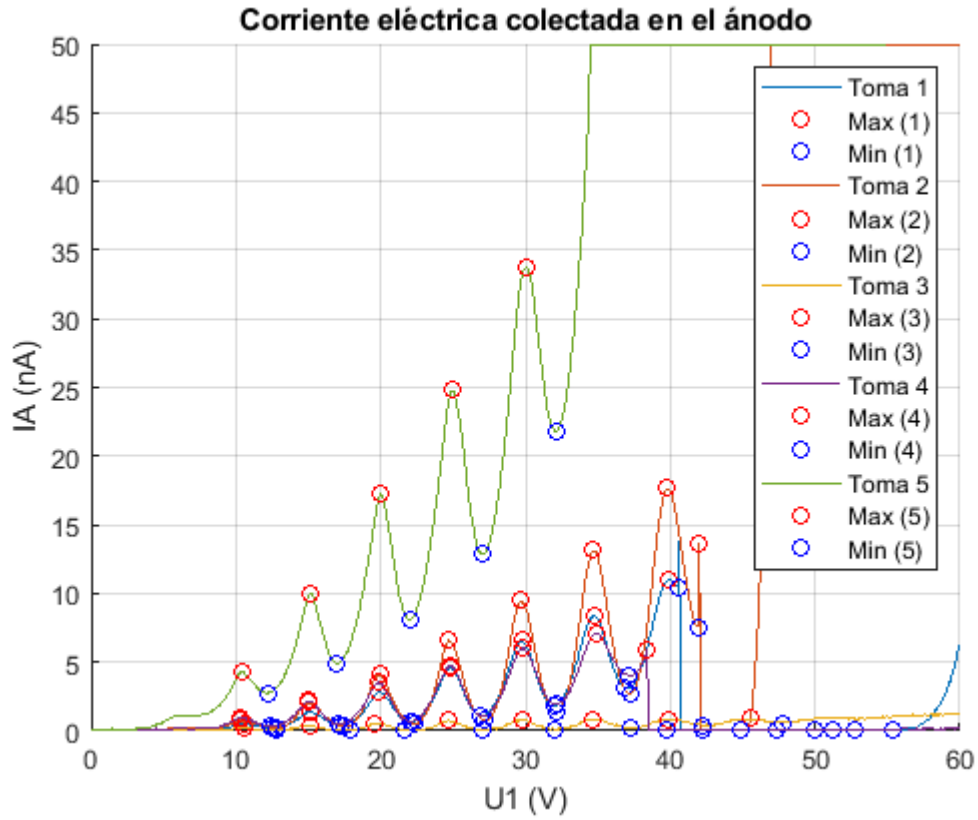
```
clear all; close all; clc
filename = 'FH_Hg.xlsx';
num_sheets = 5;
data_matrices = cell(num_sheets, 1);
for sheet = 1:num_sheets
    [~, ~, raw_data] = xlsread(filename, sheet);
    numeric_data = [];
    for row = 1:size(raw_data, 1)
        if isnumeric(raw_data{row, 1}) && isnumeric(raw_data{row, 2})
            numeric_data = [numeric_data; raw_data{row, 1}, raw_data{row, 2}];
        end
    end
    numeric_data = numeric_data(~any(isnan(numeric_data), 2), :);
    data_matrices{sheet} = numeric_data;
end
```

```
figure;
hold on;
```

```
Warning: MATLAB has disabled some advanced graphics rendering features by switching to software OpenGL. For
 more information, click here.
```

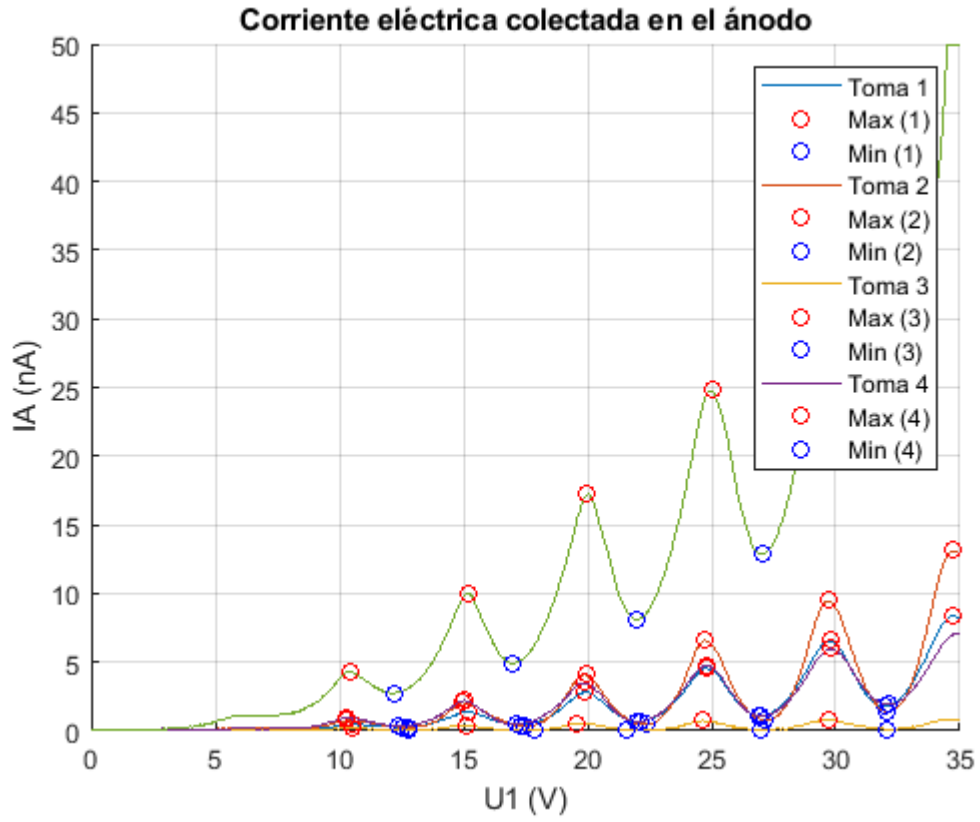
```


colors = lines(num_sheets);

peak_values = zeros(num_sheets, 4);

for sheet = 1:num_sheets

    numeric_data = data_matrices{sheet};


    x = numeric_data(:, 1);
    y = numeric_data(:, 2);
    [~, max_peak_indices] = findpeaks(y, 'MinPeakProminence', 0.2);
    max_peak_indices = remove_close_peaks(x, max_peak_indices);
    [~, min_peak_indices] = findpeaks(-y, 'MinPeakProminence', 0.2);
    min_peak_indices = remove_close_peaks(x, min_peak_indices);
    if ~isempty(min_peak_indices)
        [~, min_index] = min(y(min_peak_indices));
        peak_values(sheet, 1) = x(min_peak_indices(min_index));
        peak_values(sheet, 2) = y(min_peak_indices(min_index));
    end
    if ~isempty(max_peak_indices)
        [~, max_index] = max(y(max_peak_indices));
        peak_values(sheet, 3) = x(max_peak_indices(max_index));
        peak_values(sheet, 4) = y(max_peak_indices(max_index));
    end
    plot(x, y, 'Color', colors(sheet, :));
    plot(x(max_peak_indices), y(max_peak_indices), 'ro');
    plot(x(min_peak_indices), y(min_peak_indices), 'bo');
end
xlabel('U1 (V)');
```

```
ylabel('IA (nA)');
title('Corriente eléctrica colectada en el ánodo');
legend('Toma 1', 'Max (1)', 'Min (1)', 'Toma 2', 'Max (2)', 'Min (2)', 'Toma 3', 'Max (3)', 'Mi
grid on

hold off;
```




```
figure;
hold on;

colors = lines(num_sheets);
max_peak_values = [];
max_peak_x_values = [];
min_peak_values = [];
min_peak_x_values = [];

for sheet = 1:num_sheets
    numeric_data = data_matrices{sheet};
    x = numeric_data(:, 1);
    y = numeric_data(:, 2);
   indices = x <= 35;
    x = x(indices);
    y = y(indices);

    [~, max_peak_indices] = findpeaks(y, 'MinPeakProminence', 0.2);
    max_peak_indices = remove_close_peaks(x, max_peak_indices);
    max_peak_values = [max_peak_values; y(max_peak_indices)];
```

```
    max_peak_x_values = [max_peak_x_values; x(max_peak_indices)];
    [~, min_peak_indices] = findpeaks(-y, 'MinPeakProminence', 0.2);

    min_peak_indices = remove_close_peaks(x, min_peak_indices);

    min_peak_values = [min_peak_values; y(min_peak_indices)];
    min_peak_x_values = [min_peak_x_values; x(min_peak_indices)];

    plot(x, y, 'Color', colors(sheet, :));

    plot(x(max_peak_indices), y(max_peak_indices), 'ro');

    plot(x(min_peak_indices), y(min_peak_indices), 'bo');
end
xlabel('U1 (V)');
ylabel('IA (nA)');
title('Corriente eléctrica colectada en el ánodo');
legend('Toma 1', 'Max (1)', 'Min (1)', 'Toma 2', 'Max (2)', 'Min (2)', 'Toma 3', 'Max (3)', 'Mi
grid on

hold off;
```




```
min_I_Hg = (reshape(min_peak_x_values,[],num_sheets))';
Eexc1_Hg = diff(min_I_Hg')'
```

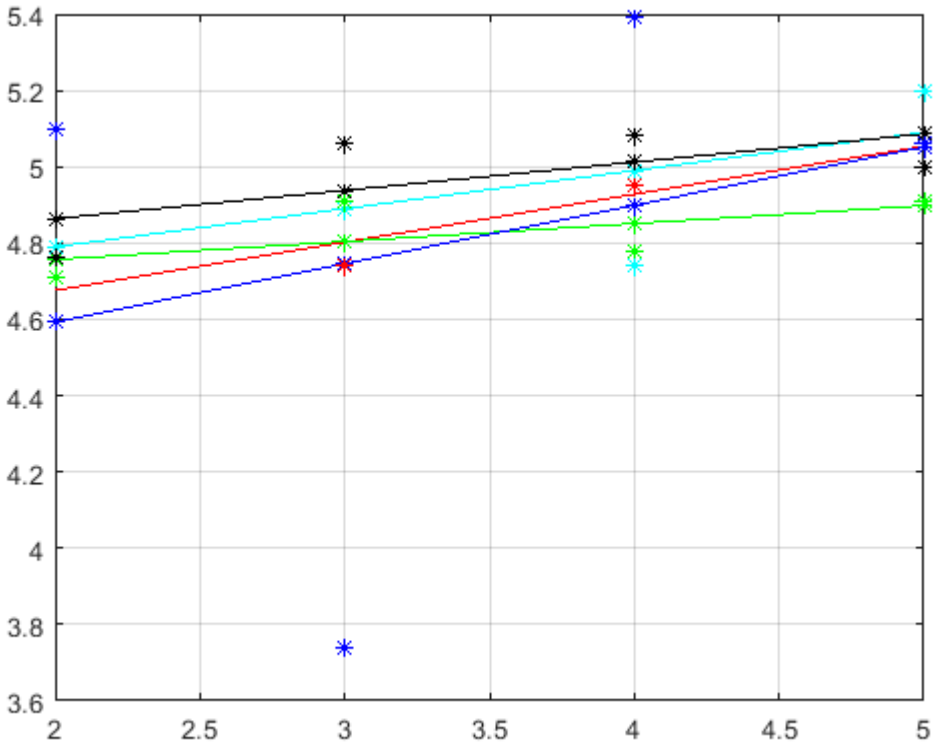
```
Eexc1_Hg = 5×4
    4.7100    4.7400    4.9500    5.0600
    4.7100    4.9100    4.7800    4.9100
```

```
    5.1000    3.7400    5.3900    5.0600
    4.7600    5.0600    4.7400    5.2000
    4.7600    5.0600    5.0800    5.0000
```

```
nmin = [1:length(Eexc1_Hg(1,:))]+1
```

```
nmin = 1×4
     2     3     4     5
```

```
CoefT1 = polyfit(nmin,Eexc1_Hg(1,:),1);
CoefT2 = polyfit(nmin,Eexc1_Hg(2,:),1);
CoefT3 = polyfit(nmin,Eexc1_Hg(3,:),1);
CoefT4 = polyfit(nmin,Eexc1_Hg(4,:),1);
CoefT5 = polyfit(nmin,Eexc1_Hg(5,:),1);
plot(nmin,polyval(CoefT1,nmin),'r',nmin,polyval(CoefT2,nmin),'g',nmin,polyval(CoefT3,nmin), ...
    'b',nmin,polyval(CoefT4,nmin),'c',nmin,polyval(CoefT5,nmin),'k')
hold on
plot(nmin,Eexc1_Hg(1,:),'r*',nmin,Eexc1_Hg(2,:),'g*',nmin,Eexc1_Hg(3,:), ...
    'b*',nmin,Eexc1_Hg(4,:),'c*',nmin,Eexc1_Hg(5,:),'k*')
grid on
```




```
 min_I_Hg = (reshape(min_peak_x_values,[],num_sheets))';
 Eexc1_Hg = diff(min_I_Hg')'
```

```
Eexc1_Hg = 5×4
    4.7100    4.7400    4.9500    5.0600
    4.7100    4.9100    4.7800    4.9100
    5.1000    3.7400    5.3900    5.0600
    4.7600    5.0600    4.7400    5.2000
```

```
    4.7600    5.0600    5.0800    5.0000
```

```
mean_Eexc_Hg = mean(Eexc1_Hg)
```

```
mean_Eexc_Hg = 1×4
    4.8080    4.7020    4.9880    5.0460
```

```
Err_Eexc_Hg = std(Eexc1_Hg)
```

```
Err_Eexc_Hg = 1×4
    0.1651    0.5537    0.2628    0.1057
```

```
function peak_indices = remove_close_peaks(x, peak_indices)
    threshold_distance = 1;
    peak_distances = diff(x(peak_indices));
    keep_indices = [1; find(peak_distances > threshold_distance) + 1];
    peak_indices = peak_indices(keep_indices);
end
```