

# Low\_pass\_filter.py

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01| def read_file_into_list(file_path):
02|     data = []
03|     with open(file_path, 'r') as file:
04|         for line in file:
05|             # Split each line into two parts (assuming
columns are separated by whitespace)
06|             parts = line.strip().split()
07|             # Convert the parts into floats and append
to the data list
08|             data.append([float(parts[0]),
float(parts[1])])
09|     return data
10|
11|
12|
13|
14| def apply_low_pass_filter(data, window_size, step_size):
15|     filtered_data = []
16|     for i in range(0, len(data), step_size): # Adjusted
to iterate with step size
17|         # Calculate start and end indices for the moving
average window
18|         start_index = max(0, i - window_size + 1)
19|         end_index = min(i + step_size, len(data))
20|
21|         # Apply the moving average filter
22|         x_filtered = sum(d[0] for d in
data[start_index:end_index]) / (end_index - start_index)
23|         y_filtered = sum(d[1] for d in
data[start_index:end_index]) / (end_index - start_index)
24|
25|         # Calculate uncertainties as the range of the
filter
26|         x_uncertainty = abs(data[end_index - 1][0] -
data[start_index][0]) / 2
27|         y_uncertainty = abs(data[end_index - 1][1] -
data[start_index][1]) / 2
28|
29|         filtered_data.append([x_filtered, y_filtered,
x_uncertainty, y_uncertainty])
30|
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31|     return filtered_data
32|
33|
34| def write_data(data, file_path):
35|     with open(file_path, 'w') as file:
36|         for sublist in data:
37|             # Convert the sublist elements to strings
and join them with a tab separator
38|             line = '\t'.join(str(x) for x in sublist) +
'\n'
39|             file.write(line)
40|
41| # Example usage:
42| file_path = "voltage_vs_current_table_final.txt" #
Replace this with the actual file path
43| new_file = "filtered_data_final10.txt"
44| data = read_file_into_list(file_path)
45|
46| window_size = 30
47| step_size = 8
48| filtered_data = apply_low_pass_filter(data, window_size,
step_size)
49|
50| print(filtered_data)
51|
52| write_data(filtered_data, new_file)
53|

```