Chhabra Jensen Algorithm for estimating multifractal spectra

Input:
  Timeseries (vector)
  qValues (vector index i)
  scales (vector index j)

Example:
  [1 2 1 5 3 2 9 1]
  [-3 -2 -1 0 1 2 3]
  [1 2 3]

Loop through
i, j until all qValues and scales

For each qValue(i) and scales(j)
calculate matricies
Ma(i,j), **Mf**(i,j), **Md**(i,j)
Algorithm shown separately

$muScales(j) = -\log_{10}(2^{scales(j)})$

Regress the rows of **Ma**(i,:), **Mf**(i,:), **Md**(i,:) against
muScales and obtain slopes α(i), f(i), D(i) for each row

%for the i-th qValue and j-th scale:

Example for i=1, j=1:

window=2^scales(j);
q=qValues(i);

window=2^1;
q=-3;

%break the time series into windows & sum
TimeseriesReshaped=reshape(Timeseries,[],window);
TimeseriesSummed=sum(Timeseries);

[1 2 1 5;   3 2 9 1]'
1+2+1+5+3+2+9+1 = 24

%calculate p
ps=sum(TimeseriesReshaped);
p=ps./TimeseriesSummed;

[1+2+1+5=9   3+2+9+1=15]
[9/24=0.375   15/24=0.625]

Nor=sum(p.^q);
mu=(p.^q)/Nor;

0.375^-3+0.625^-3 = 23.059
[0.375^-3/23.059 = 0.8224
 0.625^-3/23.059 = 0.1776]

Md(i,j)=log10(Nor);
Ma(i,j)=sum(mu.*log10(p));
Mf(i,j)=sum(mu.*log10(mu));

log10(23.059) = 1.3628;
-0.3503 + -0.0363 = -0.3866
-0.0698 + -0.1333 = -0.2032

Output:
  α, f

$D=\dfrac{d}{1-qValues}$

Example:
  α = [1.49 1.45 1.35 1.14 0.86 0.65 0.56]
  f =[0.66 0.77 0.91 1 0.86 0.56 0.33]
  D = [1.28 1.22 1.13 1 0.86 0.74 0.67]