

```
In[1]:= ClearAll["Global`*"]
SetDirectory[
  "/Users/humayrajeba/Documents/Wolfram Mathematica/processed_data_dBm"];
data = Import["updated_vr_2.txt", "Table"];
micromobility = data[[All, 2]];
SetDirectory["/Users/humayrajeba/Documents/Wolfram Mathematica/THzBlock"];
data = Import["Set3_H=135cm_L13=450cm_L12=300cm/DATA_UNCAL_Meas22", "Table"];
avgParam = 20;
percentage = 5;
blockage = data[[All, 2]];

In[2]:= micromobility
blockage
```

Out[1]=

```
{-14.7971, -14.7969, -14.7938, -14.7932, -14.797, -14.7968, -14.7959, -14.7972, -14.7998,
-14.7997, -14.8006, -14.8028, -14.8039, ... 299 976 ..., -24.7048, -24.701, -24.6858,
-24.6883, -24.694, -24.6929, -24.6926, -24.702, -24.7066, -24.704, -24.6975, -24.7082}
```

Full expression not available (original memory size: 7.2 MB)



Out[2]=

```
2.35756×10-6, 2.35756×10-6, 2.35756×10-6, 2.35756×10-6, 2.21344×10-6, 2.35756×10-6,
2.21344×10-6, 2.21344×10-6, 2.35756×10-6, 2.21344×10-6, 2.35756×10-6, 2.35756×10-6,
2.21344×10-6, 2.21344×10-6, 2.35756×10-6, 2.50167×10-6, 2.7899×10-6, ... 79 964 ... ,
6.10451×10-6, 6.10451×10-6, 5.9604×10-6, 5.81629×10-6, 5.67217×10-6, 5.38394×10-6,
5.38394×10-6, 5.23983×10-6, 5.23983×10-6, 5.23983×10-6, 5.09572×10-6, 5.09572×10-6,
4.9516×10-6, 4.9516×10-6, 4.9516×10-6, 4.80749×10-6, 4.80749×10-6, 4.80749×10-6}
```

Full expression not available (original memory size: 1.9 MB)



```
In[3]:= (*Calculate the weighted signal and its exponential moving average*)
block1 = 10 * Log10[blockage]
```

Out[3]=

```
{-56.2754, -56.2754, -56.2754, -56.2754, -56.2754, -56.5493, -56.2754, -56.5493, -56.5493,
-56.2754, -56.5493, -56.2754, -56.2754, ... 79 974 ..., -52.689, -52.689, -52.8068, -52.8068,
-52.8068, -52.9279, -52.9279, -53.0525, -53.0525, -53.0525, -53.1808, -53.1808, -53.1808}
```

Full expression not available (original memory size: 1.9 MB)



```
In[4]:= micro1 = Take[micromobility]
```

Out[4]=

```
{-14.7971, -14.7969, -14.7938, -14.7932, -14.797, -14.7968, -14.7959, -14.7972, -14.7998,
-14.7997, -14.8006, -14.8028, -14.8039, ... 299 976 ..., -24.7048, -24.701, -24.6858,
-24.6883, -24.694, -24.6929, -24.6926, -24.702, -24.7066, -24.704, -24.6975, -24.7082}
```

Full expression not available (original memory size: 7.2 MB)



```
In[=]:= microPeriodogram = PeriodogramArray@micro1
ListLinePlot[micro1, PlotRange -> All]
```

```
blockPeriodogram = PeriodogramArray@block1
ListLinePlot[block1 + 35, PlotRange -> All]
```

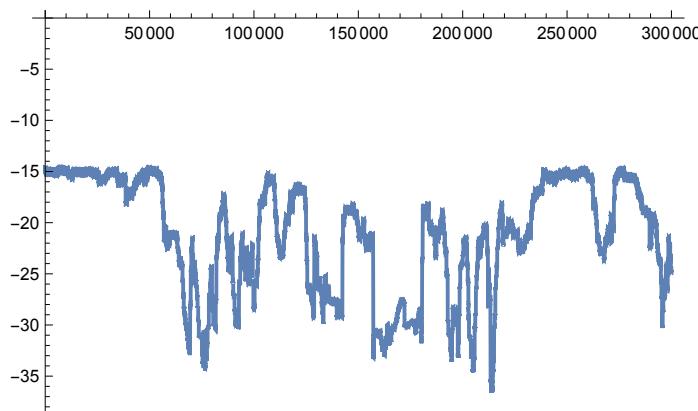
Out[=]=

$\{1.34959 \times 10^8, 1.55055 \times 10^6, 125411., 554524., 332049., 27877.8, 79171.6, 160071., 31609.9,$
 $457895., 54353.1, 34902.6, 66112.4, \dots 299975 \dots, 33899.2, 66112.4, 34902.6, 54353.1,$
 $457895., 31609.9, 160071., 79171.6, 27877.8, 332049., 554524., 125411., 1.55055 \times 10^6\}$

Full expression not available (original memory size: 2.4 MB)



Out[=]=



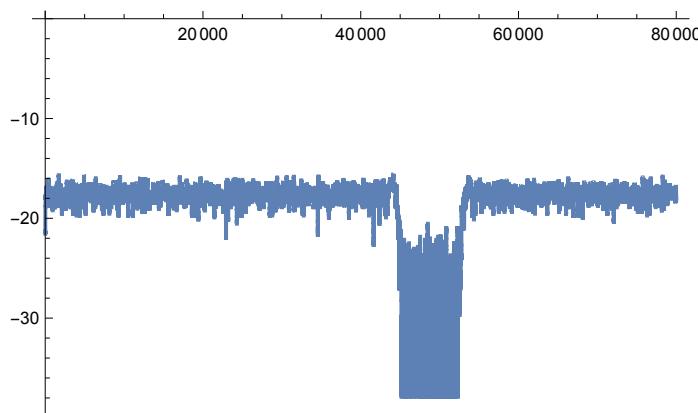
Out[=]=

$\{2.30049 \times 10^8, 76480.3, 71028., 60399.1, 47904.4, 35121.7, 23885.7, 14186.5, 6382.24,$
 $2808.34, 619.054, 178.768, 560.247, \dots 79974 \dots, 2232.03, 957.728, 398.313, 450.223,$
 $2182.64, 5337.34, 12624.6, 21985.1, 33205.7, 46336.8, 59118.4, 69809.5, 75610.8\}$

Full expression not available (original memory size: 0.6 MB)



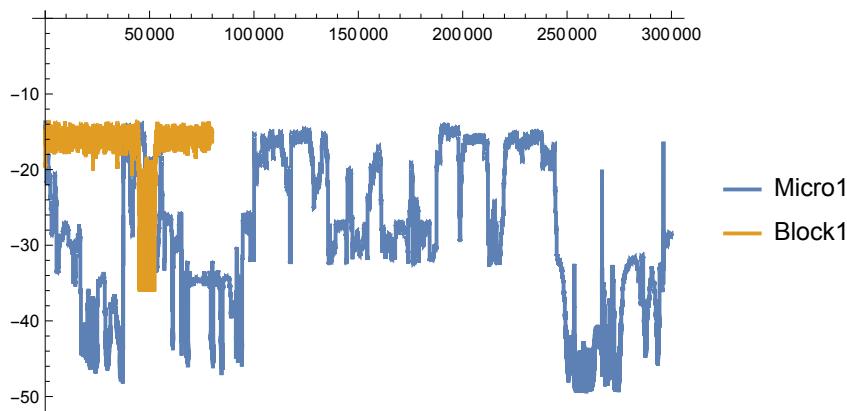
Out[=]=



```
In[=]:= microPeriodogram = PeriodogramArray[micro1];
blockPeriodogram = PeriodogramArray[block1];

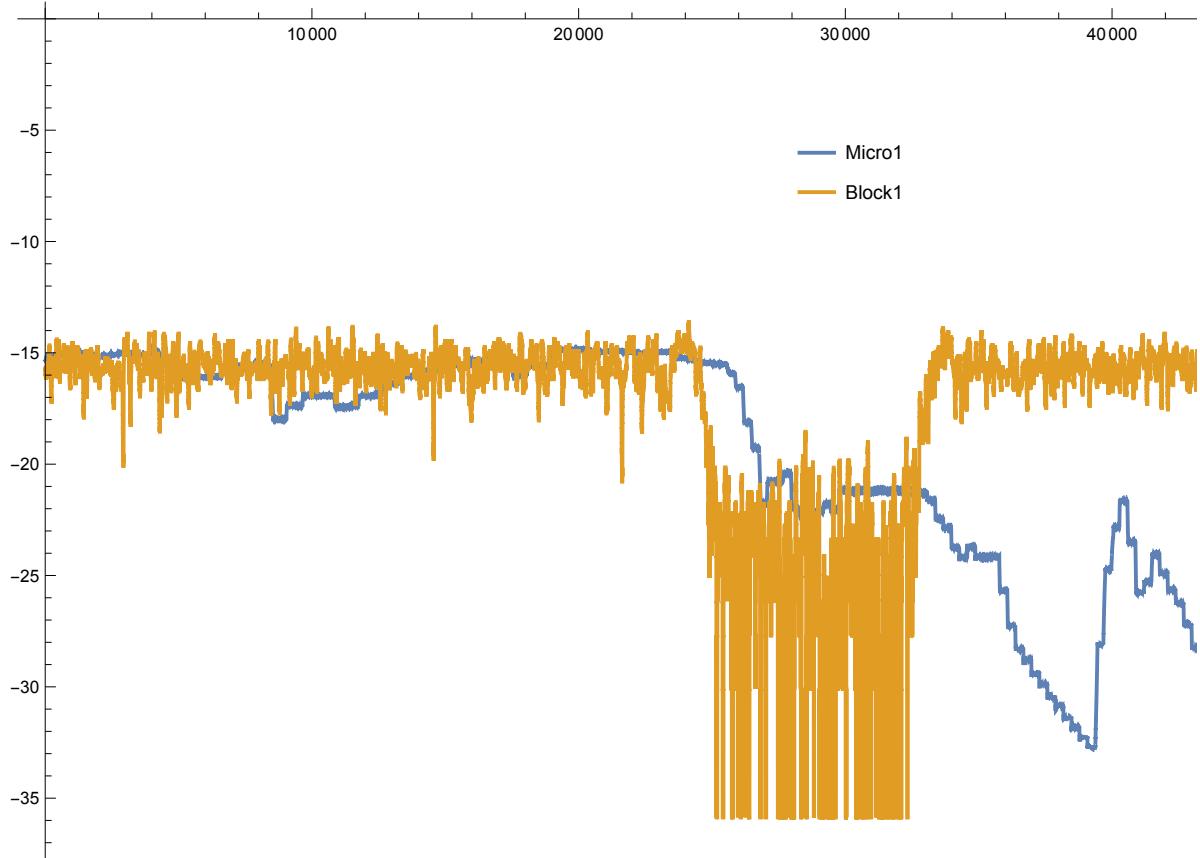
ListLinePlot[{micro1, block1 + 37},
PlotRange → All, PlotLegends → {"Micro1", "Block1"}]
```

Out[=]=



```
In[=]:= ListLinePlot[{micro1[[30 000 ;; 80 000]], block1[[20 000 ;; 70 000]] + 37},
PlotRange → All, PlotStyle → {BlueGray},
PlotLegends → Placed[{"Micro1", "Block1"}, {0.6, 0.8}]]
```

Out[=]=



```
In[4]:= block = block1 + 35
decayRate1 = 0.001;
movingAvg1 = Re[ExponentialMovingAverage[block, decayRate1]]
ListLinePlot[movingAvg1, PlotRange -> All]
decayRate2 = 0.0001;
movingAvg2 = Re[ExponentialMovingAverage[block, decayRate2]]
ListLinePlot[movingAvg2, PlotRange -> All]
```

Out[4]=

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.5493, -21.2754, -21.5493,
-21.5493, -21.2754, -21.5493, -21.2754, ... 79976 ..., -17.689, -17.8068, -17.8068,
-17.8068, -17.9279, -17.9279, -18.0525, -18.0525, -18.0525, -18.1808, -18.1808, -18.1808}
```

Full expression not available (original memory size: 1.9 MB)



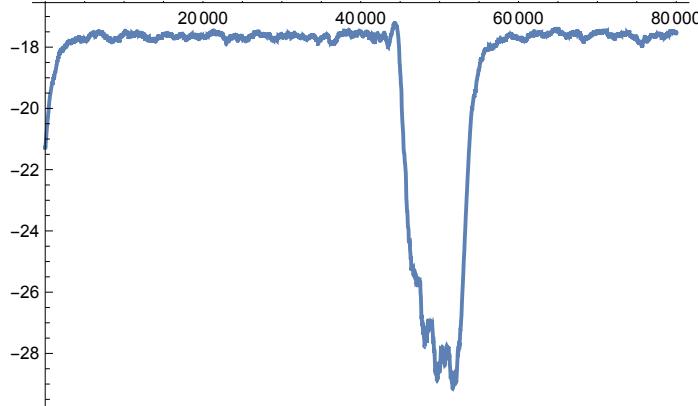
Out[5]=

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2757, -21.2757, -21.2759, -21.2762,
-21.2762, -21.2765, -21.2765, -21.2765, ... 79975 ..., -17.5124, -17.5127, -17.513,
-17.5133, -17.5137, -17.5142, -17.5147, -17.5152, -17.5158, -17.5164, -17.5171, -17.5178}
```

Full expression not available (original memory size: 1.9 MB)



Out[6]=



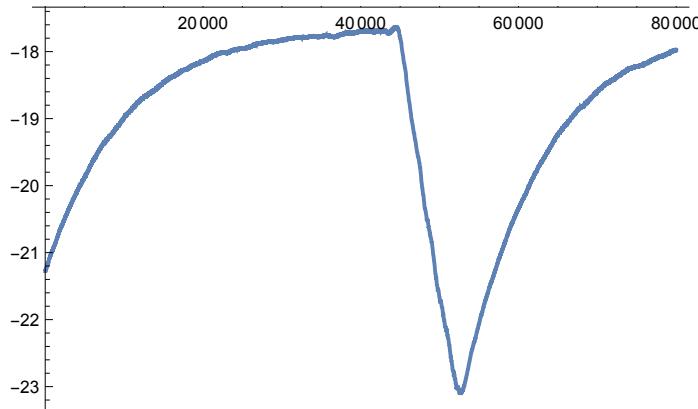
Out[6]=

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2755,
-21.2755, -21.2755, -21.2755, -21.2755, ... 79975 ..., -17.9727, -17.9727, -17.9727,
-17.9726, -17.9726, -17.9726, -17.9726, -17.9727, -17.9727, -17.9727, -17.9727, -17.9727}
```

Full expression not available (original memory size: 1.9 MB)



Out[•] =



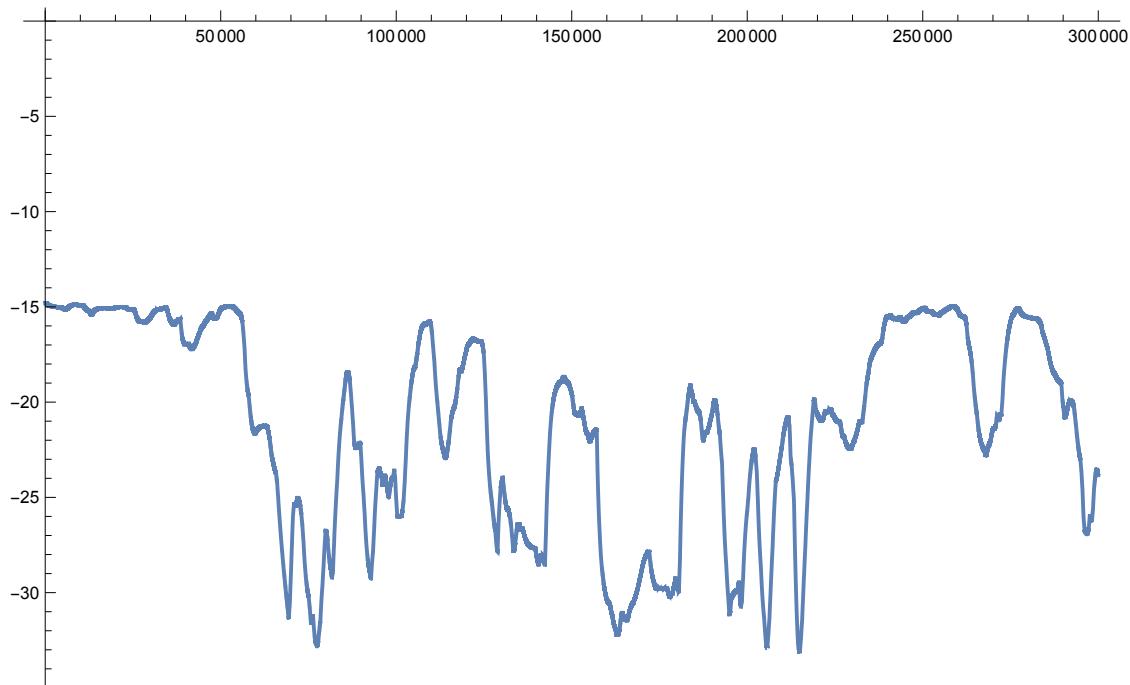
```
In[8]:= movingAvg3 = Re[ExponentialMovingAverage[micromobility, decayRate1]]  
ListLinePlot[movingAvg3, PlotRange -> All]  
movingAvg4 = Re[ExponentialMovingAverage[micromobility, decayRate2]]  
ListLinePlot[movingAvg4, PlotRange -> All]
```

Out[•] =

```
{-14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971,
-14.7971, -14.7971, -14.7971, -14.7972, ..., 299.977 ..., -23.8237, -23.8246, -23.8255,
-23.8263, -23.8272, -23.8281, -23.8289, -23.8298, -23.8307, -23.8316, -23.8324, -23.8333}
```

Full expression not available (original memory size: 2.4 MB)

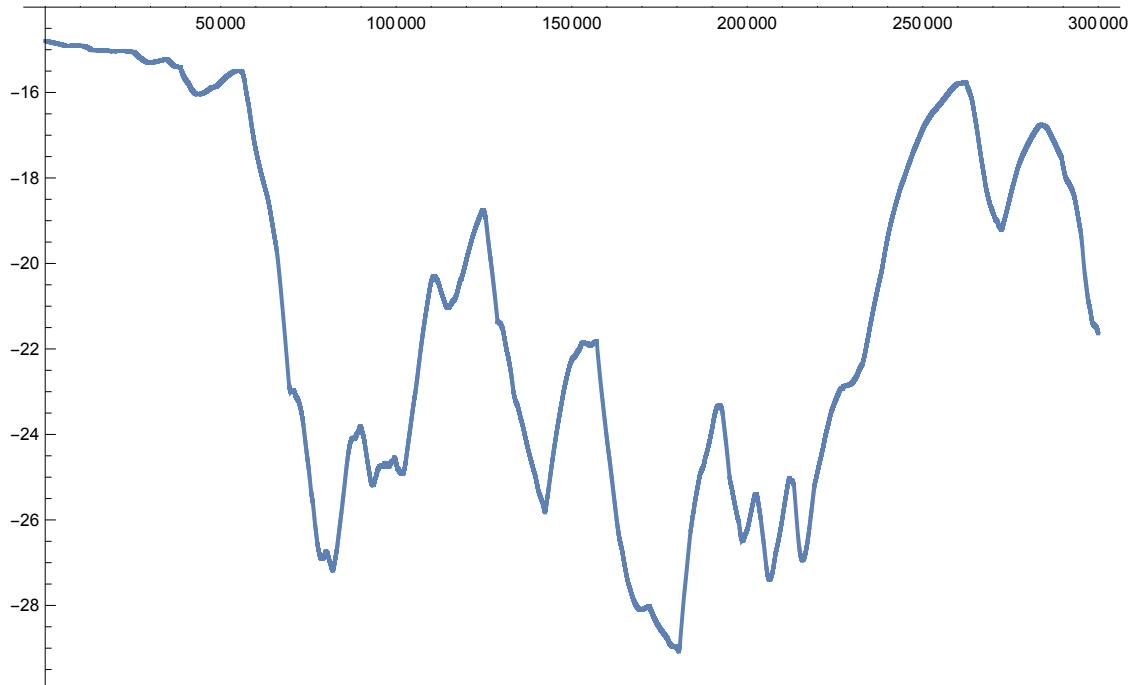
Out[•] =



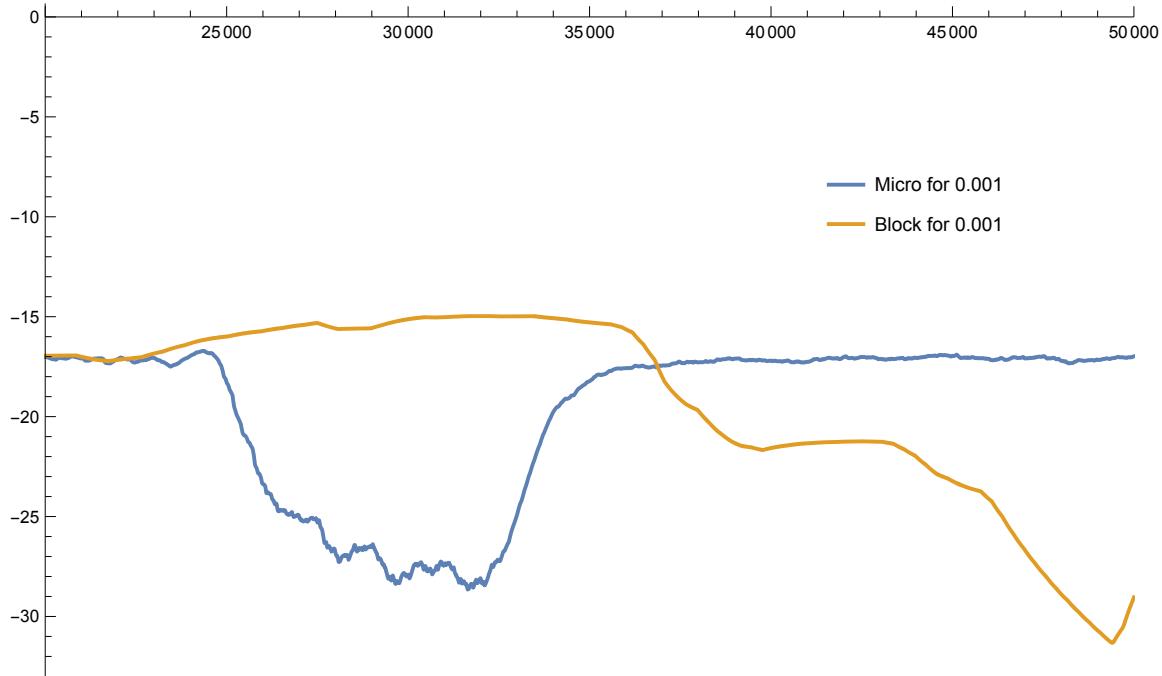
Out[•] =

```
{-14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971, -14.7971,
-14.7971, -14.7971, -14.7971, -14.7971, ..., 299.977..., -21.6333, -21.6336, -21.6339,
-21.6342, -21.6345, -21.6348, -21.6351, -21.6354, -21.6357, -21.636, -21.6363, -21.6366}
```

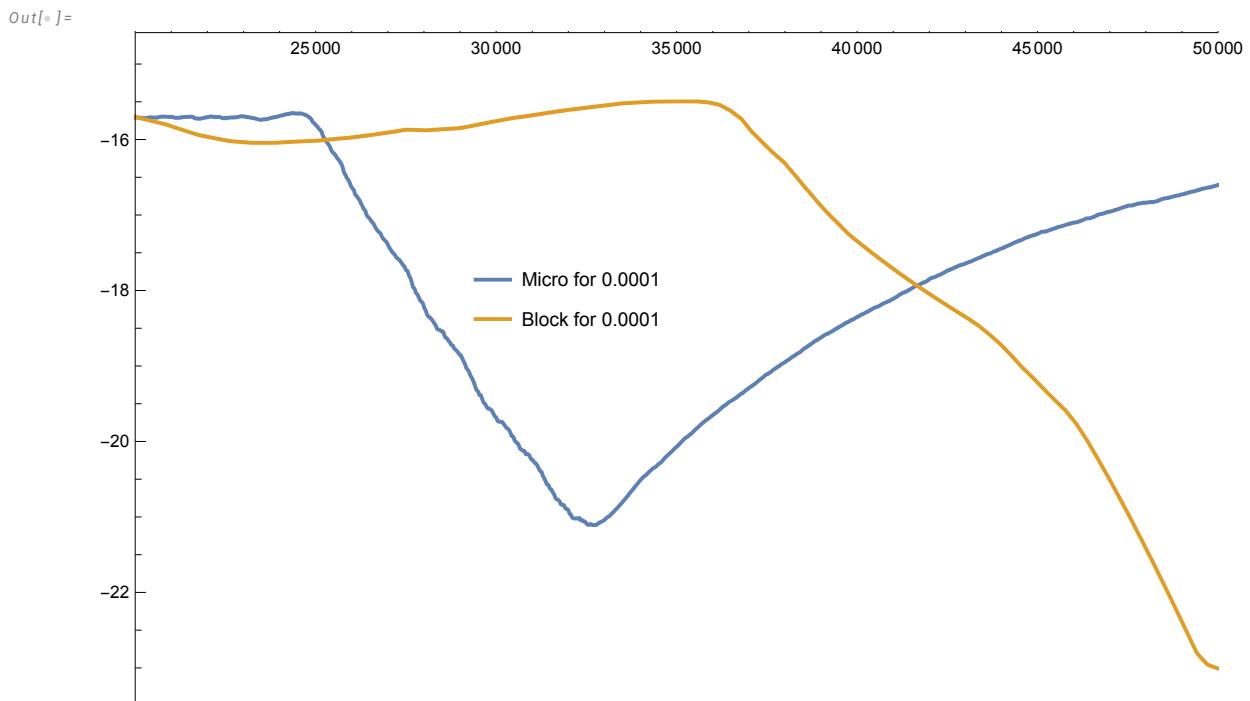
Full expression not available (original memory size: 2.4 MB)

Out[⁶] =

```
In[6] := ListLinePlot[{movingAvg1[[20 000 ;; 70 000]] + 0.5, movingAvg3[[20 000 ;; 70 000]]},
  PlotRange → {{20 000, 50 000}, All}, PlotStyle → {BlueGray},
  PlotLegends → Placed[{"Micro for 0.001", "Block for 0.001"}, {0.8, 0.7}]]
```

Out[⁶] =

```
In[6]:= ListLinePlot[{movingAvg2[[20 000 ;; 70 000]] + 1.99, movingAvg4[[20 000 ;; 70 000]]},  
PlotRange → {{20 000, 50 000}, All}, PlotStyle → {BlueGray},  
PlotLegends → Placed[{"Micro for 0.0001", "Block for 0.0001"}, {0.4, 0.6}]]
```



```
In[=]:= (*Initialize the list to store the sum of periodograms without decay rate*)
sumPeriodograms = {};

(*Calculate the number of segments*)
numSegments = Quotient[Length[block], 500];

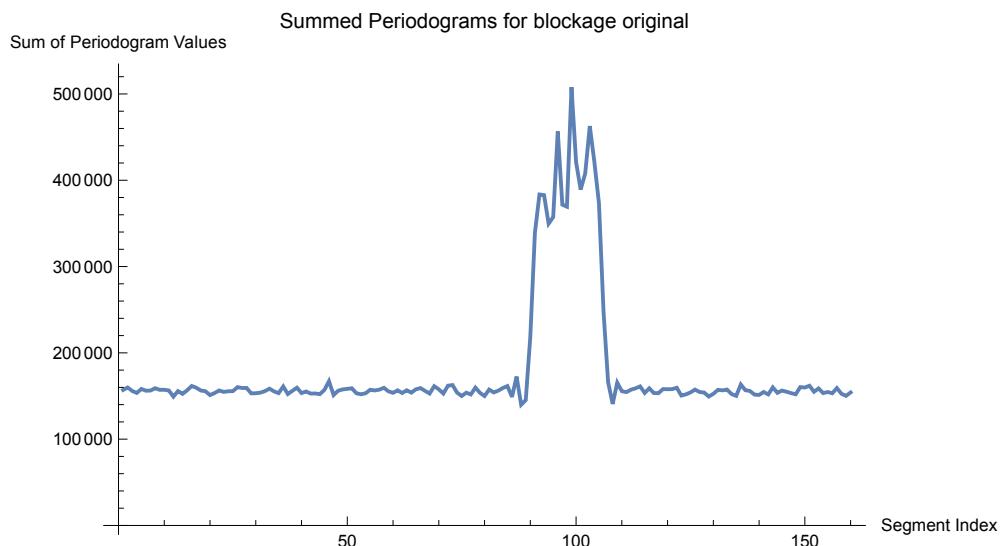
(*Loop through each segment*)
For[i = 1, i ≤ numSegments, i++,
  (*Extract the i^th segment of 500 values*)
  blockSegment = Take[block, {500 * (i - 1) + 1, 500 * i}];
  (*Compute the periodogram for the current segment*)
  periodogram = PeriodogramArray[blockSegment];
  (*Sum up the values of the periodogram*)
  sumPeriodogram = Total[periodogram];
  (*Append the sum to the list*)
  AppendTo[sumPeriodograms, sumPeriodogram];]

(*Output the list of summed periodograms for blockage trace*)
sumPeriodograms

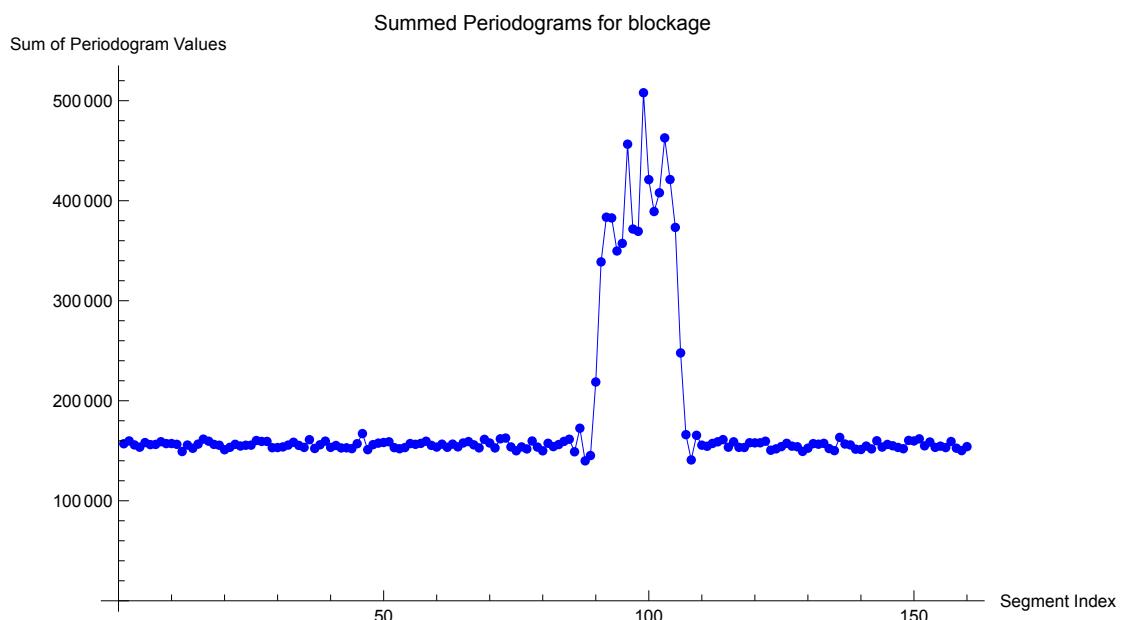
Out[=]= {156999., 159843., 155849., 153551., 158178., 156125., 156326., 159035.,
157153., 157208., 156418., 149249., 155707., 152467., 156637., 161624.,
159546., 156356., 155529., 151034., 153419., 156424., 154742., 155509.,
155609., 160251., 159306., 159335., 153034., 153201., 153846., 155668.,
158504., 155335., 153345., 161077., 152272., 155984., 159612., 153391.,
155270., 152797., 152931., 152132., 157041., 167167., 151092., 156117.,
157649., 158272., 158941., 153130., 152008., 153188., 157202., 156422.,
157334., 159512., 155373., 153678., 156579., 153470., 156628., 153892.,
157786., 159170., 155919., 152878., 161399., 157743., 152836., 161951.,
162691., 153864., 149983., 153853., 151807., 159749., 153673., 149952.,
157470., 154153., 156199., 159331., 161516., 148977., 172525., 139896.,
145235., 218742., 338821., 383502., 382763., 349751., 357320., 456513.,
371662., 369374., 507946., 421076., 389181., 407920., 462813., 421187.,
373314., 247803., 166089., 140815., 165437., 155582., 154501., 157315.,
158951., 161149., 153546., 158947., 153414., 153265., 158005., 157873.,
157948., 159537., 150529., 151908., 154146., 157435., 154610., 153991.,
149352., 152559., 157103., 156552., 157422., 152207., 150130., 163362.,
156734., 155817., 151588., 151227., 154670., 151846., 159991., 153676.,
156325., 154975., 153288., 152011., 160342., 159806., 161912., 154936.,
158756., 153378., 154618., 153180., 159240., 152576., 150147., 154137.}
```

```
In[=]:= (*Plot the summed periodograms for blockage trace*)
ListLinePlot[sumPeriodograms, PlotRange -> All,
PlotLabel -> "Summed Periodograms for blockage original",
AxesLabel -> {"Segment Index", "Sum of Periodogram Values"}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms, Joined -> True, PlotStyle -> {Blue, Thin},
PlotRange -> All, PlotMarkers -> {Automatic, Small},
PlotLabel -> "Summed Periodograms for blockage",
AxesLabel -> {"Segment Index", "Sum of Periodogram Values"}, ImageSize -> Large]
```

Out[=]=



Out[=]=



```
In[=]:= (*Initialize the list to store the sum of periodograms without decay rate*)
sumPeriodograms1 = {};

(*Calculate the number of segments*)
numSegments1 = Quotient[Length[micromobility], 500];

(*Loop through each segment*)
For[i = 1, i ≤ numSegments1, i++,
  (*Extract the i^th segment of 500 values*)
  microSegment1 = Take[micromobility, {500 * (i - 1) + 1, 500 * i}];
  (*Compute the periodogram for the current segment*)
  periodogram1 = PeriodogramArray[microSegment1];
  (*Sum up the values of the periodogram*)
  sumPeriodogram1 = Total[periodogram1];
  (*Append the sum to the list*)
  AppendTo[sumPeriodograms1, sumPeriodogram1];]

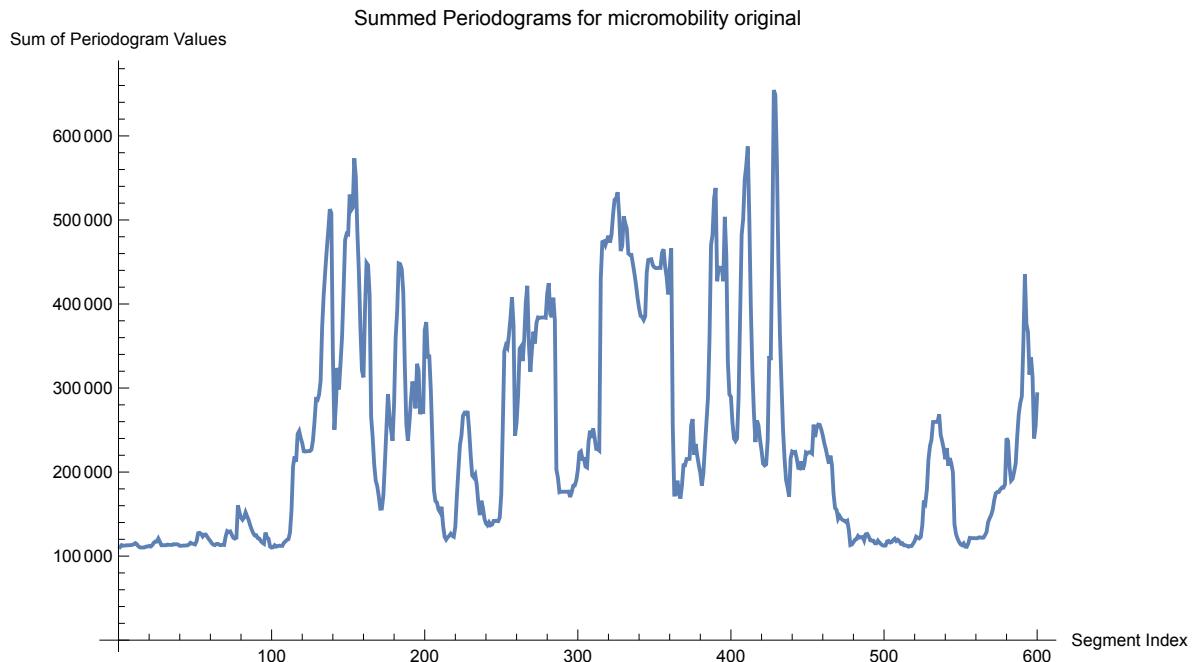
(*Output the list of summed periodograms for micromobility*)
sumPeriodograms1

Out[=]= {110764., 113099., 112409., 112518., 112847., 112930., 112930., 113073.,
113375., 114266., 115440., 114230., 111619., 110369., 110191., 110253.,
110323., 111403., 111457., 112122., 111360., 112838., 115827., 117301.,
117310., 120906., 117087., 112930., 112914., 113065., 112845., 113661.,
113376., 113396., 113276., 114205., 113995., 114164., 113676., 112225.,
112249., 112544., 112460., 112748., 112757., 113757., 115876., 114848.,
114528., 113854., 117668., 127287., 127735., 126320., 123353., 125622.,
125661., 122942., 120225., 117935., 115107., 113582., 113050., 114521.,
114493., 113237., 113028., 113584., 113270., 123476., 129750., 128693.,
129337., 125412., 121774., 120821., 121819., 160528., 151978., 145760.,
143240., 145792., 151967., 147318., 142893., 136687., 131499., 127308.,
124548., 124776., 121401., 120865., 117848., 115921., 114680., 127985.,
122033., 120640., 111287., 110128., 110537., 112898., 111275., 111791.,
112473., 112205., 112178., 115775., 117431., 119389., 120101., 127979.,
154592., 206539., 218705., 212360., 245363., 248779., 240745., 234370.,
224851., 224471., 224764., 224993., 224981., 226645., 237509., 259274.,
286596., 285838., 292110., 308287., 371855., 410361., 438263., 464276.,
487343., 512787., 508227., 341484., 250392., 281309., 323973., 298384.,
329138., 360931., 416048., 476202., 483561., 482907., 530136., 511733.,
514693., 573362., 551124., 486434., 438098., 371564., 321117., 312718.,
393334., 448816., 446130., 410834., 265968., 241591., 209184., 189641.,
183126., 171188., 156394., 156577., 172259., 210992., 251855., 292820.,
265698., 250168., 237192., 281891., 359361., 391036., 448262., 447457.,
441284., 413631., 326120., 256982., 237157., 258532., 285771., 307680.,
296892., 275844., 328871., 320688., 268824., 281199., 269343., 368488.,
378475., 337430., 337512., 297020., 237550., 178810., 165463., 163649.,
155473., 152302., 158681., 136468., 123081., 119698., 122392., 124074.,
```

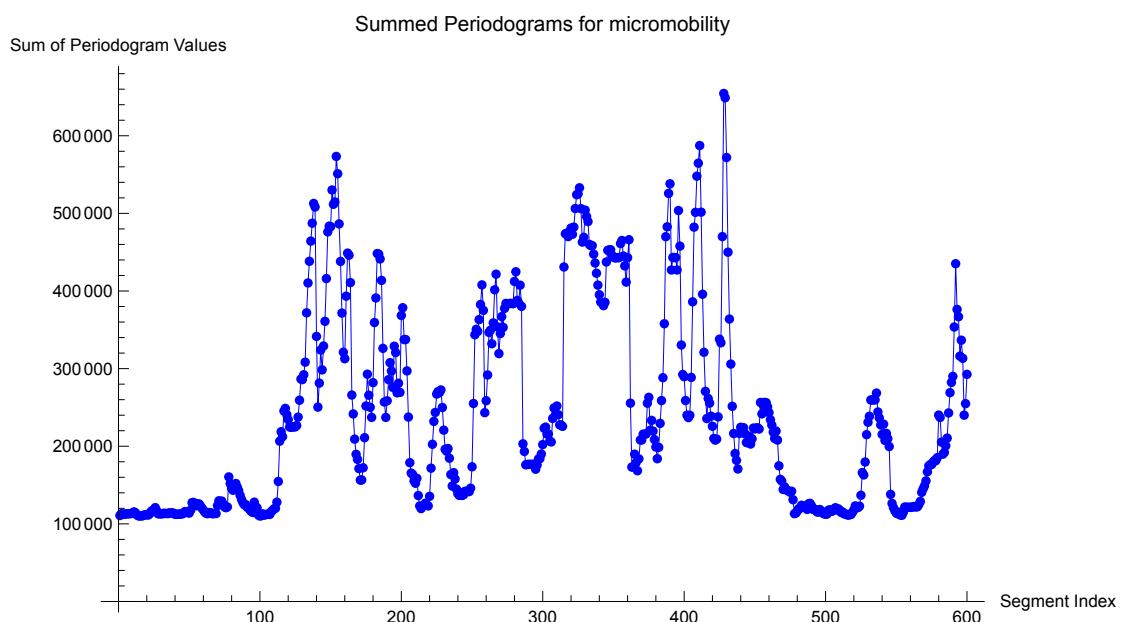
126 612., 124 231., 123 124., 135 473., 171 739., 202 541., 232 026., 243 552.,
 267 185., 270 423., 269 153., 272 510., 249 904., 220 735., 196 090., 193 676.,
 197 034., 184 562., 163 574., 148 738., 165 941., 157 755., 144 749., 138 858.,
 136 693., 140 112., 136 631., 137 526., 141 902., 141 887., 141 873., 141 534.,
 145 946., 173 520., 255 075., 343 622., 350 683., 347 893., 363 093., 382 578.,
 407 858., 375 028., 243 260., 258 626., 291 808., 346 638., 349 468., 332 059.,
 358 915., 401 529., 421 646., 353 750., 319 358., 345 176., 367 043., 353 076.,
 377 634., 384 018., 383 565., 383 811., 384 001., 383 969., 383 605., 412 312.,
 424 773., 387 859., 384 457., 407 480., 380 165., 203 102., 193 285., 176 043.,
 176 613., 176 614., 176 638., 176 618., 176 687., 176 749., 170 387., 175 910.,
 183 699., 184 024., 190 016., 202 150., 223 136., 224 651., 215 644., 215 752.,
 206 700., 205 548., 235 856., 249 263., 240 562., 251 847., 240 665., 227 548.,
 227 272., 225 650., 430 923., 473 724., 474 531., 470 093., 476 100., 481 126.,
 473 045., 482 320., 506 236., 524 062., 525 187., 532 982., 506 109., 463 044.,
 469 141., 504 213., 495 920., 489 460., 460 006., 458 415., 458 429., 447 475.,
 436 046., 422 896., 407 570., 395 201., 385 780., 384 664., 381 111., 385 416.,
 437 400., 452 406., 452 874., 453 228., 446 008., 443 673., 442 696., 442 710.,
 443 122., 442 951., 461 078., 465 095., 444 992., 432 315., 411 487., 442 957.,
 466 087., 255 508., 173 145., 173 236., 189 748., 178 755., 168 457., 183 755.,
 208 055., 208 059., 215 490., 215 537., 215 784., 255 447., 262 995., 220 582.,
 233 316., 219 467., 208 538., 198 935., 183 921., 198 597., 229 444., 258 806.,
 288 339., 357 834., 470 014., 482 659., 525 795., 538 093., 427 049., 443 217.,
 443 075., 443 062., 427 078., 503 690., 457 805., 330 413., 292 450., 289 644.,
 258 902., 239 992., 236 902., 239 965., 288 695., 386 047., 482 249., 501 329.,
 547 924., 564 641., 587 376., 501 582., 395 831., 321 034., 270 714., 235 667.,
 261 467., 255 515., 238 722., 225 713., 210 007., 207 907., 209 168., 237 840.,
 337 962., 333 263., 470 082., 654 520., 648 956., 571 950., 449 981., 363 881.,
 305 823., 251 423., 216 421., 190 634., 181 874., 170 687., 216 466., 224 432.,
 223 364., 223 938., 216 127., 204 881., 204 386., 212 775., 202 852., 209 615.,
 223 390., 222 332., 223 560., 223 703., 222 177., 256 419., 241 729., 252 612.,
 256 539., 256 125., 250 833., 243 389., 234 153., 227 220., 218 171., 210 029.,
 219 564., 207 990., 174 799., 157 314., 155 129., 144 334., 147 740., 144 579.,
 142 915., 142 195., 140 678., 142 013., 131 096., 113 157., 113 873., 116 455.,
 119 476., 120 133., 123 969., 122 058., 122 415., 122 823., 118 623., 125 871.,
 126 440., 123 392., 118 781., 118 448., 118 413., 115 322., 115 161., 118 432.,
 116 249., 114 138., 112 885., 112 426., 112 564., 117 508., 118 084., 116 134.,
 116 722., 119 345., 120 806., 117 948., 119 401., 117 618., 114 738., 115 274.,
 112 925., 112 831., 112 129., 111 163., 111 976., 112 085., 114 814., 117 936.,
 123 140., 122 075., 121 044., 122 833., 136 851., 166 036., 163 039., 179 669.,
 214 940., 230 917., 238 576., 259 610., 259 745., 259 776., 259 724., 268 536.,
 244 180., 236 510., 227 497., 215 267., 228 496., 207 555., 216 587., 209 775.,
 199 584., 137 965., 126 406., 120 953., 116 902., 114 010., 112 963., 115 079.,
 111 335., 111 045., 114 965., 121 700., 121 398., 121 394., 121 384., 121 223.,
 121 341., 122 309., 122 238., 121 747., 122 060., 125 066., 128 884., 140 621.,
 145 160., 149 038., 155 360., 167 047., 174 713., 176 313., 176 329., 179 490.,
 181 603., 181 511., 185 277., 240 172., 237 096., 205 331., 189 827., 192 008.,
 200 603., 210 468., 242 908., 269 051., 282 250., 290 024., 353 609., 435 185.,
 276 241 266 800 216 803 226 626 212 201 240 027 254 800 202 507 1

```
In[=]:= (*Plot the summed periodograms*)
ListLinePlot[sumPeriodograms1, PlotRange → All,
PlotLabel → "Summed Periodograms for micromobility original",
AxesLabel → {"Segment Index", "Sum of Periodogram Values"}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms1, Joined → True, PlotStyle → {Blue, Thin},
PlotRange → All, PlotMarkers → {Automatic, Small},
PlotLabel → "Summed Periodograms for micromobility",
AxesLabel → {"Segment Index", "Sum of Periodogram Values"}, ImageSize → Large]
```

Out[=]=

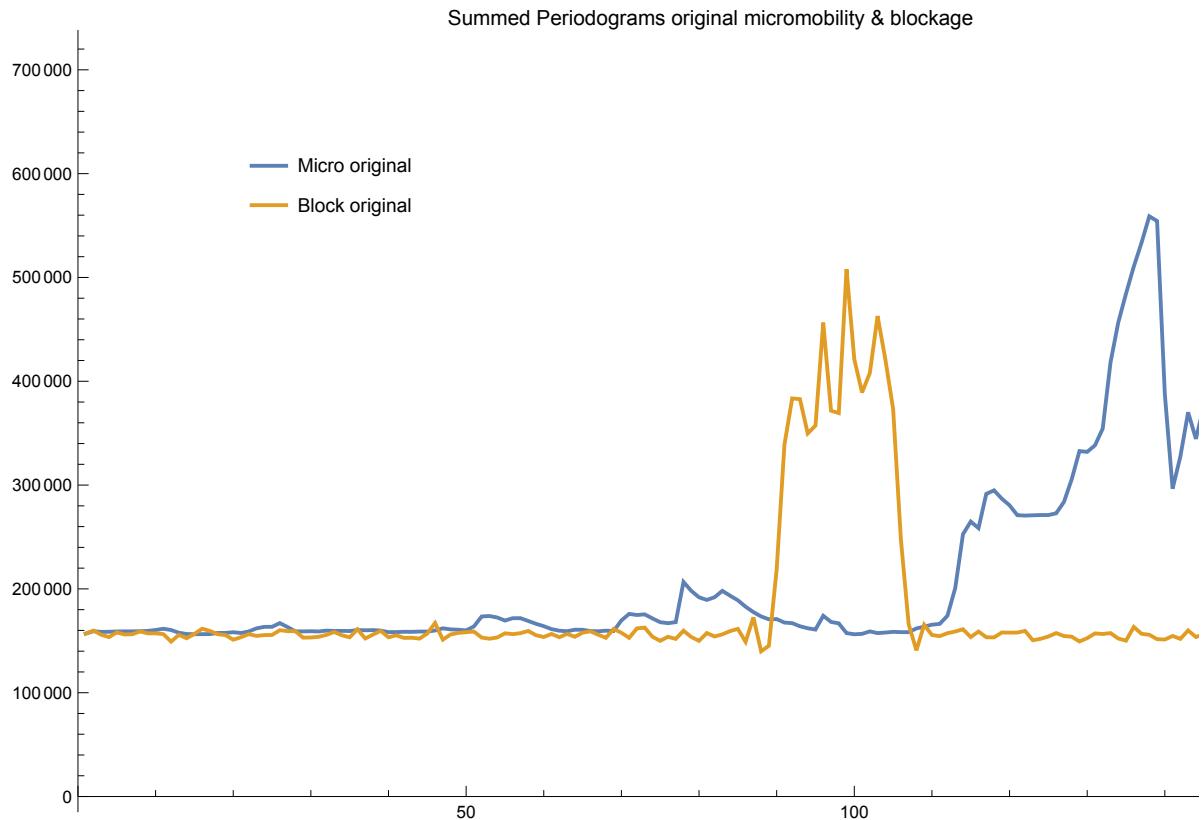


Out[=]=



```
In[]:= ListLinePlot[{sumPeriodograms1 + 46150, sumPeriodograms},  
PlotRange -> {{0, 163}, All}, PlotStyle -> {BlueGray},  
PlotLabel -> "Summed Periodograms original micromobility & blockage",  
PlotLegends -> Placed[{"Micro original", "Block original"}, {0.2, 0.8}]]
```

Out[]=



```
In[8]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for blockage*)
sumPeriodograms2 = {};

(*Calculate the number of segments*)
numSegments2 = Quotient[Length[movingAvg1], 500];

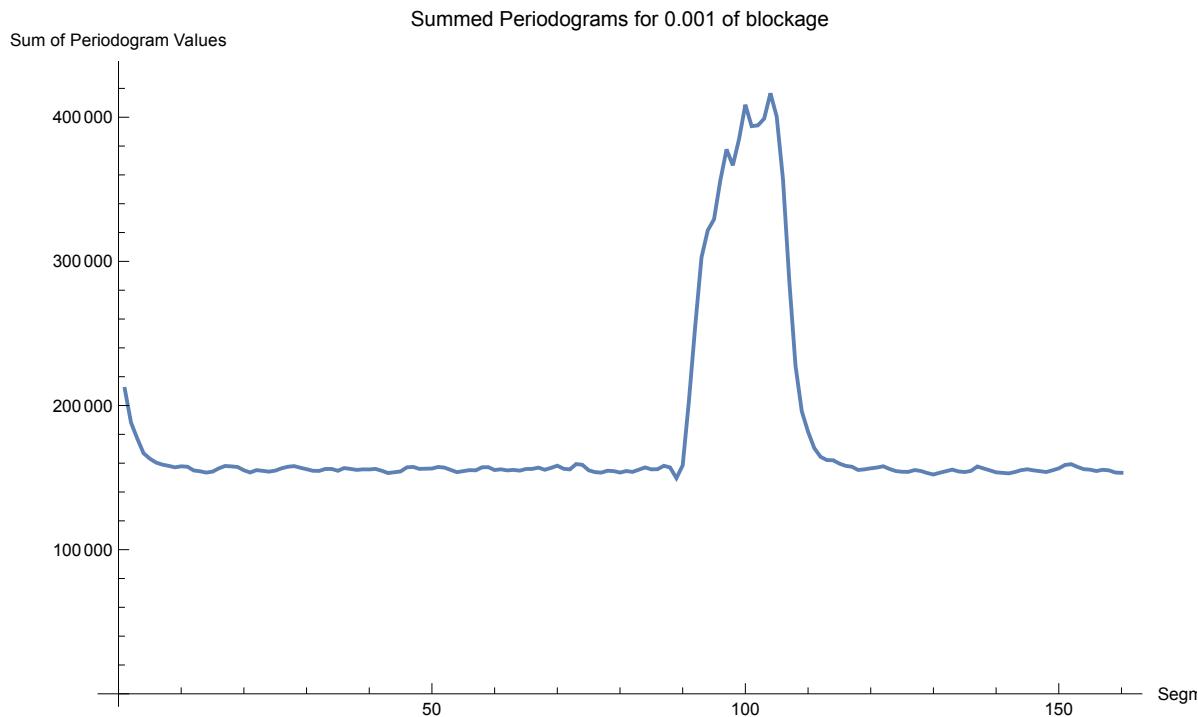
(*Loop through each segment*)
For[i = 1, i ≤ numSegments2, i++,
(*Extract the i^th segment of 500 values*)
blockSegment2 = Take[movingAvg1, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram2 = PeriodogramArray[blockSegment2];
(*Sum up the values of the periodogram*)
sumPeriodogram2 = Total[periodogram2];
(*Append the sum to the list*)
AppendTo[sumPeriodograms2, sumPeriodogram2];]

(*Output the list of summed periodograms for blockage trace*)
sumPeriodograms2
(*Plot the summed periodograms for 0.001*)
ListLinePlot[sumPeriodograms2, PlotRange → All,
PlotLabel → "Summed Periodograms for 0.001 of blockage",
AxesLabel → {"Segment Index", "Sum of Periodogram Values"}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms2, Joined → True, PlotStyle → {Blue, Thin},
PlotRange → All, PlotMarkers → {Automatic, Small},
PlotLabel → "Summed Periodograms for 0.001 of blockage",
AxesLabel → {"Segment Index", "Sum of Periodogram "}, ImageSize → Large]
```

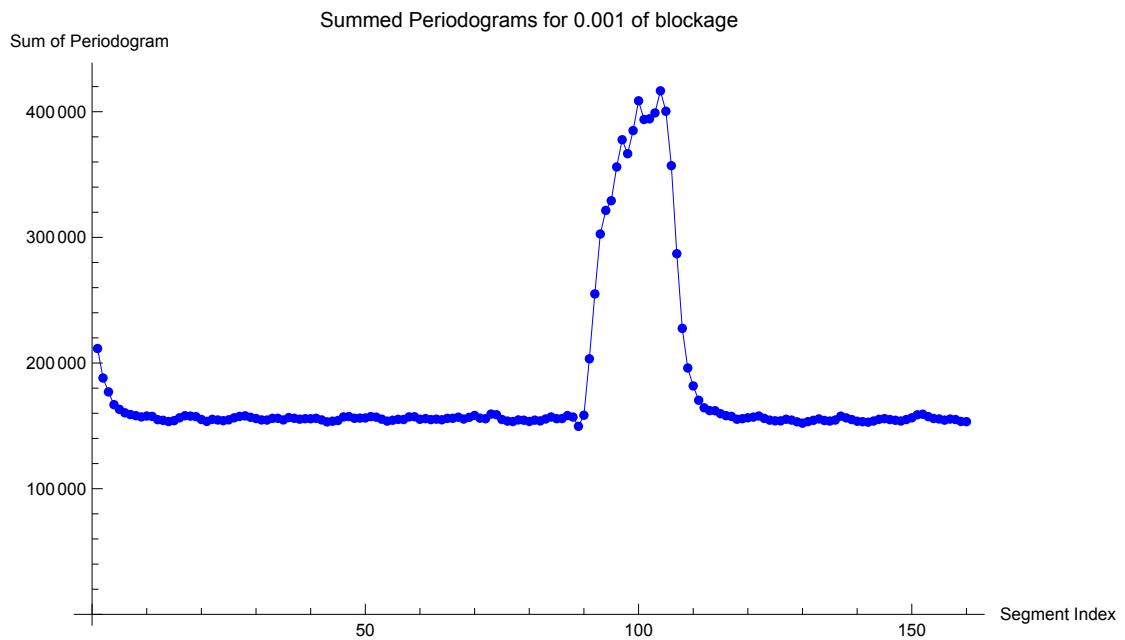
Out[•]=

```
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154827., 156413., 157523., 157972., 156831., 155834., 154735., 154643.,
155983., 156001., 154740., 156609., 156031., 155343., 155719., 155671.,
156020., 154754., 153155., 153714., 154276., 157113., 157423., 156042.,
156178., 156287., 157392., 156923., 155327., 153772., 154483., 155178.,
155049., 157141., 157238., 155249., 155761., 155001., 155348., 154839.,
155955., 156027., 156913., 155423., 156733., 158259., 156127., 155680.,
159391., 158880., 155068., 153817., 153450., 154751., 154503., 153508.,
154550., 153953., 155476., 157063., 155718., 155836., 158189., 157008.,
149628., 158454., 203362., 255011., 302677., 321472., 329173., 356038.,
377692., 366629., 384980., 408684., 393803., 394350., 399039., 416630.,
400388., 357087., 286973., 227564., 196057., 181796., 170401., 164381.,
162165., 162037., 159703., 158142., 157530., 155280., 155724., 156423.,
156984., 157846., 155972., 154550., 154018., 153983., 155241., 154590.,
153196., 152137., 153375., 154408., 155547., 154277., 153844., 154651.,
157715., 156345., 155033., 153664., 153298., 152931., 153858., 155198.,
155762., 155011., 154455., 153867., 155059., 156405., 158784., 159289.,
157373., 155831., 155496., 154552., 155409., 155037., 153526., 153331.}
```

Out[•]=



Out[\circ] =



```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for micromobility*)
sumPeriodograms3 = {};

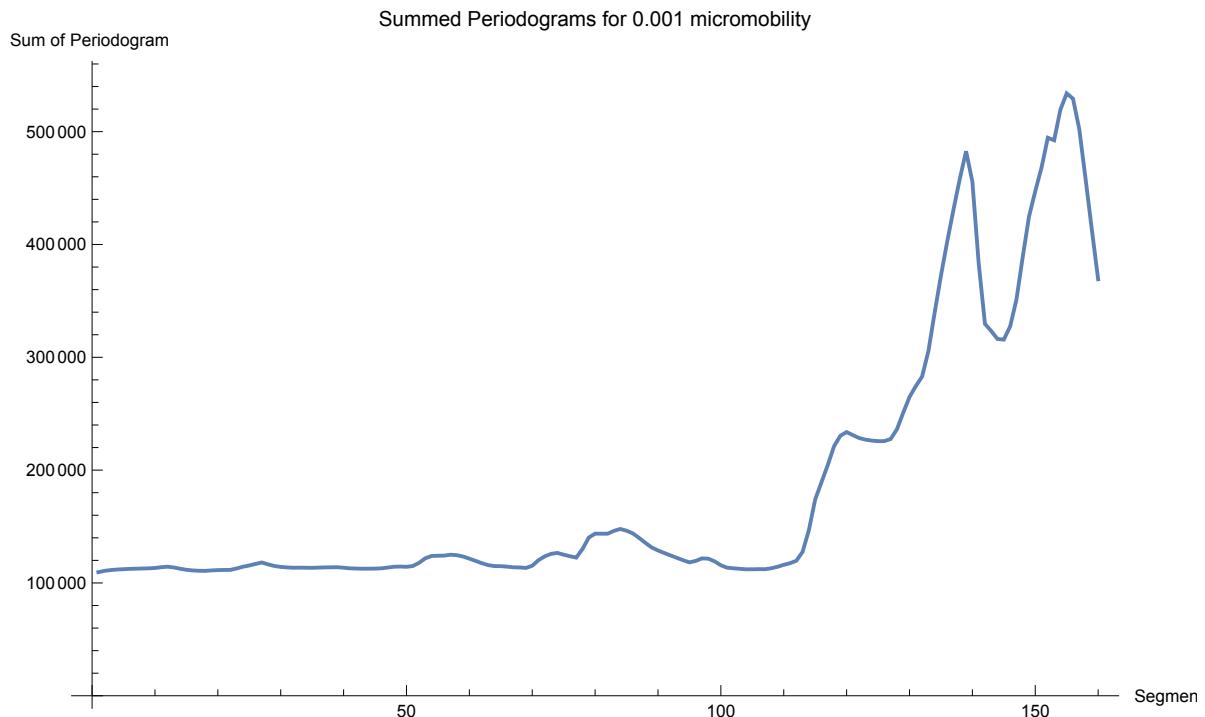
(*Calculate the number of segments*)
numSegments3 = Quotient[Length[movingAvg3], 500];

(*Loop through each segment*)
For[i = 1, i ≤ numSegments2, i++,
(*Extract the i^th segment of 500 values*)
blockSegment3 = Take[movingAvg3, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram3 = PeriodogramArray[blockSegment3];
(*Sum up the values of the periodogram*)
sumPeriodogram3 = Total[periodogram3];
(*Append the sum to the list*)
AppendTo[sumPeriodograms3, sumPeriodogram3];

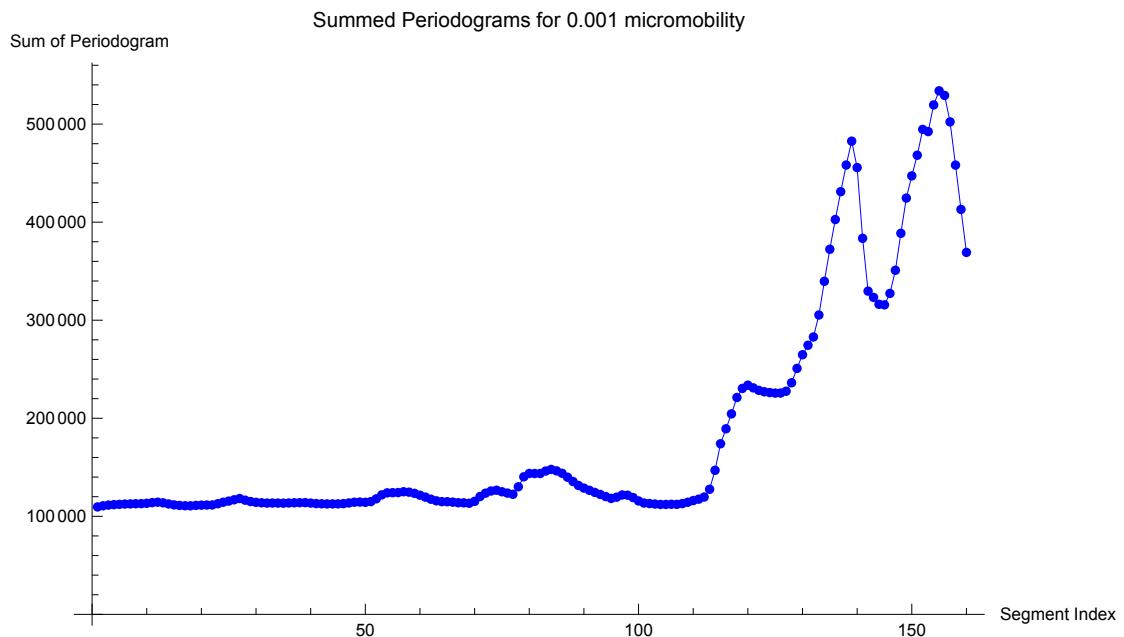
(*Output the list of summed periodograms for micromobility trace*)
sumPeriodograms3
(*Plot the summed periodograms for 0.001*)
ListLinePlot[sumPeriodograms3, PlotRange → All,
PlotLabel → "Summed Periodograms for 0.001 micromobility",
AxesLabel → {"Segment Index", "Sum of Periodogram "}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms3, Joined → True, PlotStyle → {Blue, Thin},
PlotRange → All, PlotMarkers → {Automatic, Small},
PlotLabel → "Summed Periodograms for 0.001 micromobility",
AxesLabel → {"Segment Index", "Sum of Periodogram "}, ImageSize → Large]
```

```
Out[=] = {109581., 110744., 111453., 111895., 112189., 112478., 112636., 112812.,
112925., 113265., 113964., 114389., 113725., 112605., 111655., 111077.,
110790., 110714., 111115., 111380., 111509., 111578., 112853., 114372.,
115508., 116856., 118143., 116442., 115047., 114223., 113783., 113483.,
113551., 113481., 113401., 113595., 113768., 113883., 113947., 113493.,
112974., 112763., 112635., 112651., 112708., 112942., 113616., 114359.,
114526., 114283., 114983., 117827., 121852., 123926., 124091., 124209.,
125045., 124615., 123411., 121533., 119570., 117441., 115789., 114937.,
114867., 114453., 113843., 113735., 113315., 115238., 120219., 123602.,
125798., 126599., 125036., 123684., 122440., 130105., 140277., 143687.,
143637., 143655., 146169., 147821., 146329., 143900., 139869., 135522.,
131459., 128773., 126538., 124368., 122276., 120130., 118217., 119519.,
121769., 121509., 119137., 115674., 113504., 112986., 112527., 112097.,
112113., 112254., 112181., 112974., 114308., 116061., 117491., 119654.,
127567., 146924., 174005., 189252., 204486., 221177., 230439., 233719.,
230989., 228451., 227008., 226187., 225678., 225724., 227569., 236202.,
250867., 264794., 274457., 282887., 305296., 339649., 372359., 402666.,
431091., 458241., 482604., 455665., 383489., 329641., 323253., 316215.,
315676., 327319., 350920., 388618., 424559., 447204., 468247., 494606.,
492355., 519542., 533944., 529248., 502248., 458176., 412991., 369142.}
```

Out[=] =

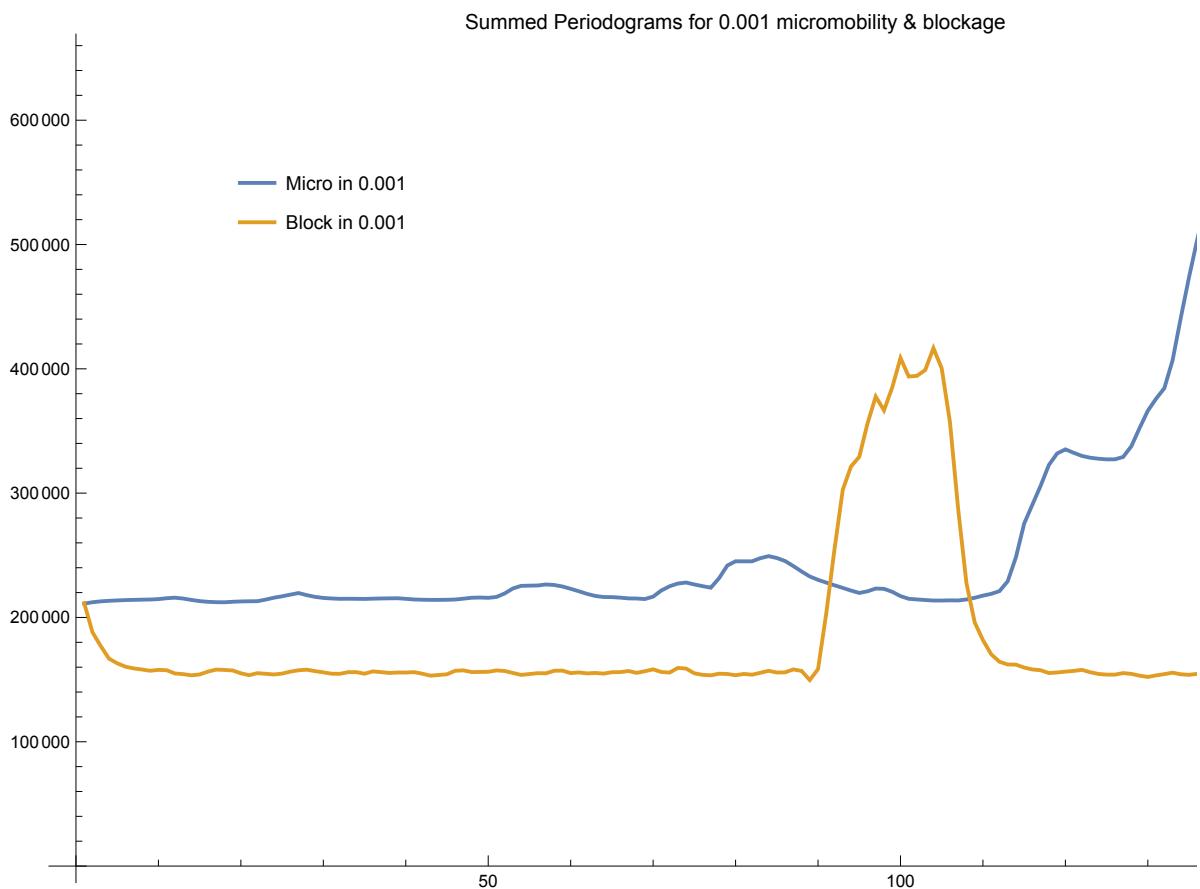


Out[•] =



```
In[•]:= ListLinePlot[{sumPeriodograms3 + 101495, sumPeriodograms2},
  PlotRange → All, PlotStyle → {BlueGray},
  PlotLabel → "Summed Periodograms for 0.001 micromobility & blockage",
  PlotLegends → Placed[{"Micro in 0.001", "Block in 0.001"}, {0.2, 0.8}]]
```

Out[•] =



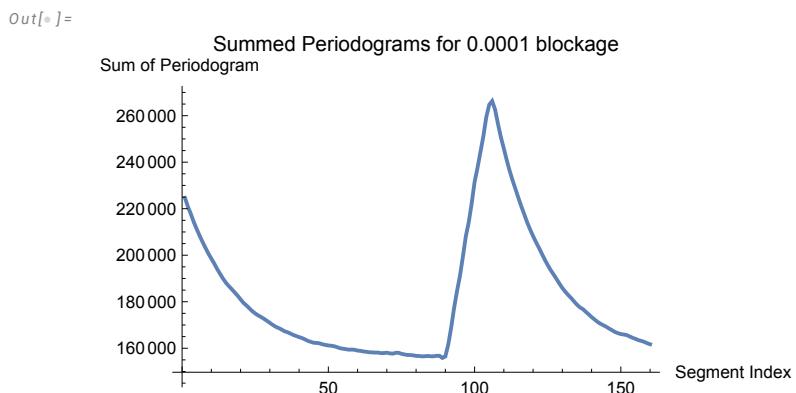
```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.0001 decay rate for blockage*)
sumPeriodograms4 = {};

(*Calculate the number of segments*)
numSegments4 = Quotient[Length[movingAvg2], 500];

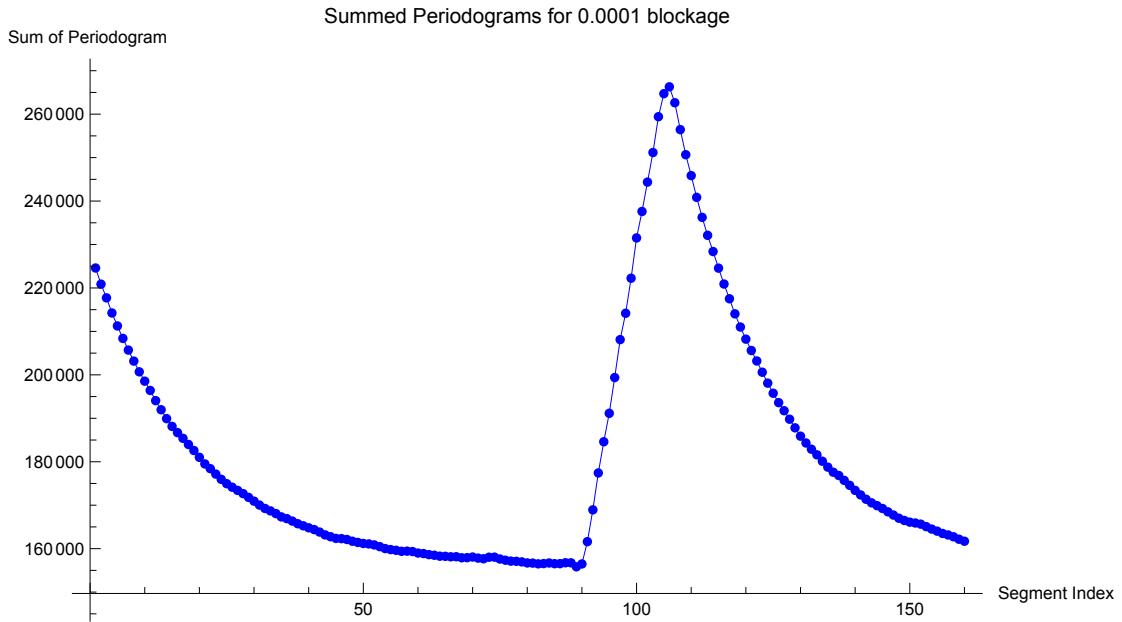
(*Loop through each segment*)
For[i = 1, i ≤ numSegments4, i++,
(*Extract the i^th segment of 500 values*)
blockSegment4 = Take[movingAvg2, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram4 = PeriodogramArray[blockSegment4];
(*Sum up the values of the periodogram*)
sumPeriodogram4 = Total[periodogram4];
(*Append the sum to the list*)
AppendTo[sumPeriodograms4, sumPeriodogram4];

(*Output the list of summed periodograms for blockage trace*)
sumPeriodograms4
(*Plot the summed periodograms for 0.0001*)
ListLinePlot[sumPeriodograms4, PlotRange → All,
PlotLabel → "Summed Periodograms for 0.0001 blockage",
AxesLabel → {"Segment Index", "Sum of Periodogram "}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms4, Joined → True, PlotStyle → {Blue, Thin},
PlotRange → All, PlotMarkers → {Automatic, Small},
PlotLabel → "Summed Periodograms for 0.0001 blockage",
AxesLabel → {"Segment Index", "Sum of Periodogram "}, ImageSize → Large]
```

```
Out[=] = {224 595., 220 873., 217 723., 214 243., 211 257., 208 389., 205 702., 203 166.,
200 697., 198 544., 196 413., 194 067., 191 968., 189 922., 188 138., 186 701.,
185 382., 183 975., 182 586., 181 021., 179 499., 178 407., 177 166., 175 956.,
174 949., 174 140., 173 402., 172 669., 171 802., 170 928., 170 027., 169 252.,
168 691., 168 070., 167 310., 166 910., 166 345., 165 737., 165 268., 164 797.,
164 387., 163 819., 163 166., 162 743., 162 361., 162 301., 162 110., 161 703.,
161 429., 161 191., 161 084., 160 859., 160 464., 160 015., 159 785., 159 615.,
159 384., 159 425., 159 333., 158 989., 158 867., 158 623., 158 479., 158 263.,
158 232., 158 126., 158 142., 157 901., 157 926., 158 070., 157 819., 157 669.,
158 026., 158 046., 157 616., 157 335., 157 122., 157 085., 156 953., 156 710.,
156 674., 156 501., 156 566., 156 697., 156 539., 156 544., 156 752., 156 740.,
155 821., 156 480., 161 610., 168 925., 177 424., 184 603., 191 149., 199 380.,
208 111., 214 173., 222 238., 231 512., 237 604., 244 363., 251 169., 259 417.,
264 720., 266 293., 262 631., 256 436., 250 670., 245 861., 240 849., 236 242.,
232 111., 228 385., 224 560., 220 903., 217 513., 214 041., 211 008., 208 220.,
205 604., 203 199., 200 606., 198 093., 195 769., 193 607., 191 750., 189 791.,
187 810., 185 886., 184 319., 182 886., 181 600., 180 118., 178 756., 177 586.,
176 841., 175 706., 174 570., 173 407., 172 368., 171 366., 170 546., 169 897.,
169 241., 168 470., 167 731., 167 002., 166 485., 166 098., 165 908., 165 640.,
165 071., 164 511., 164 031., 163 494., 163 155., 162 735., 162 168., 161 706.}
```



Out[•] =



```

In[•]:= (*Initialize the list to store the sum of
periodograms with 0.0001 decay rate for micromobility*)
sumPeriodograms5 = {};

(*Calculate the number of segments*)
numSegments5 = Quotient[Length[movingAvg4], 500];

(*Loop through each segment*)
For[i = 1, i ≤ numSegments5, i++,
  (*Extract the i^th segment of 500 values*)
  blockSegment5 = Take[movingAvg4, {500 * (i - 1) + 1, 500 * i}];
  (*Compute the periodogram for the current segment*)
  periodogram5 = PeriodogramArray[blockSegment5];
  (*Sum up the values of the periodogram*)
  sumPeriodogram5 = Total[periodogram5];
  (*Append the sum to the list*)
  AppendTo[sumPeriodograms5, sumPeriodogram5];]

(*Output the list of summed periodograms for micromobility trace*)
sumPeriodograms5

(*Plot the summed periodograms for 0.0001*)
ListLinePlot[sumPeriodograms5, PlotRange → All,
  PlotLabel → "Summed Periodograms for 0.0001 micromobility",
  AxesLabel → {"Segment Index", "Sum of Periodogram "}]
(*Plot the summed periodograms with smaller dots and thinner lines*)
ListPlot[sumPeriodograms5, Joined → True, PlotStyle → {Blue, Thin},
  PlotRange → All, PlotMarkers → {Automatic, Small},
  PlotLabel → "Summed Periodograms for 0.0001 micromobility",
  AxesLabel → {"Segment Index", "Sum of Periodogram "}, ImageSize → Large]

```

Out[•] =

```
{109489., 109632., 109775., 109911., 110042., 110182., 110313., 110447.,
110575., 110729., 110936., 111137., 111218., 111204., 111155., 111108.}
```

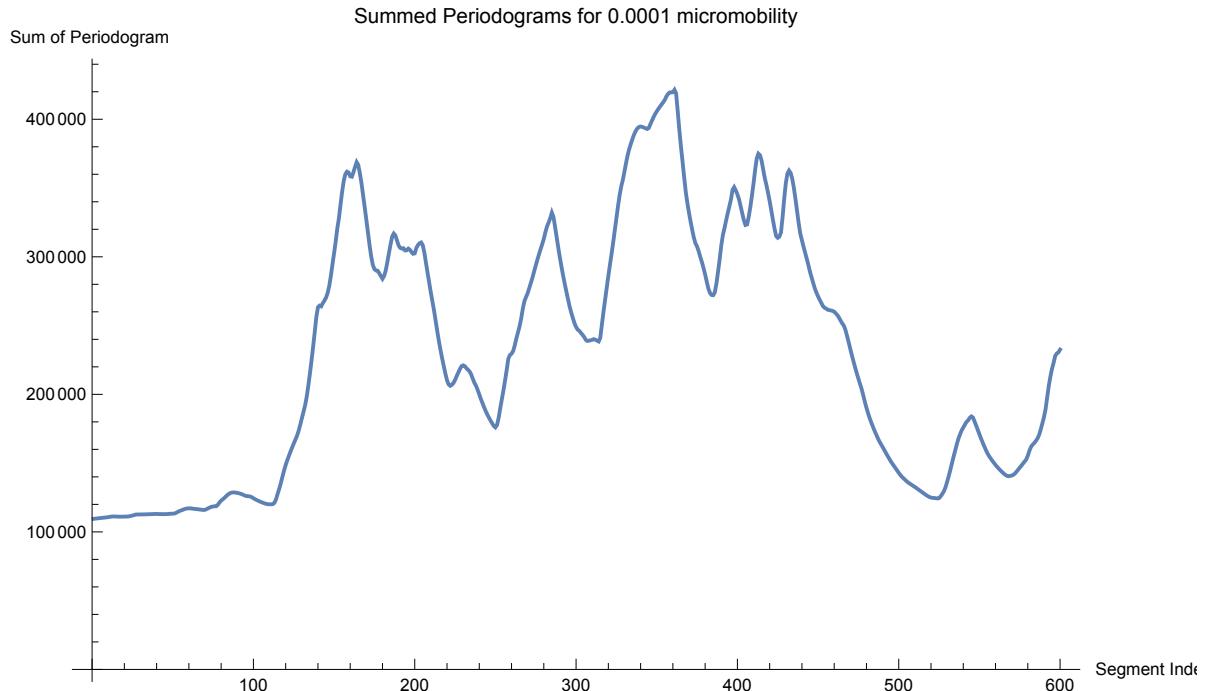
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 217779., 225873., 228538., 229526., 231473., 235674., 240683., 245074.,
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 421398., 418920., 406011., 392378., 380217., 369161., 357803., 347133.,
 338985., 332051., 325425., 319541., 313997., 309739., 307484., 304016.,
 299890., 296110., 291811., 287131., 281941., 276979., 273683., 272263.,
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```

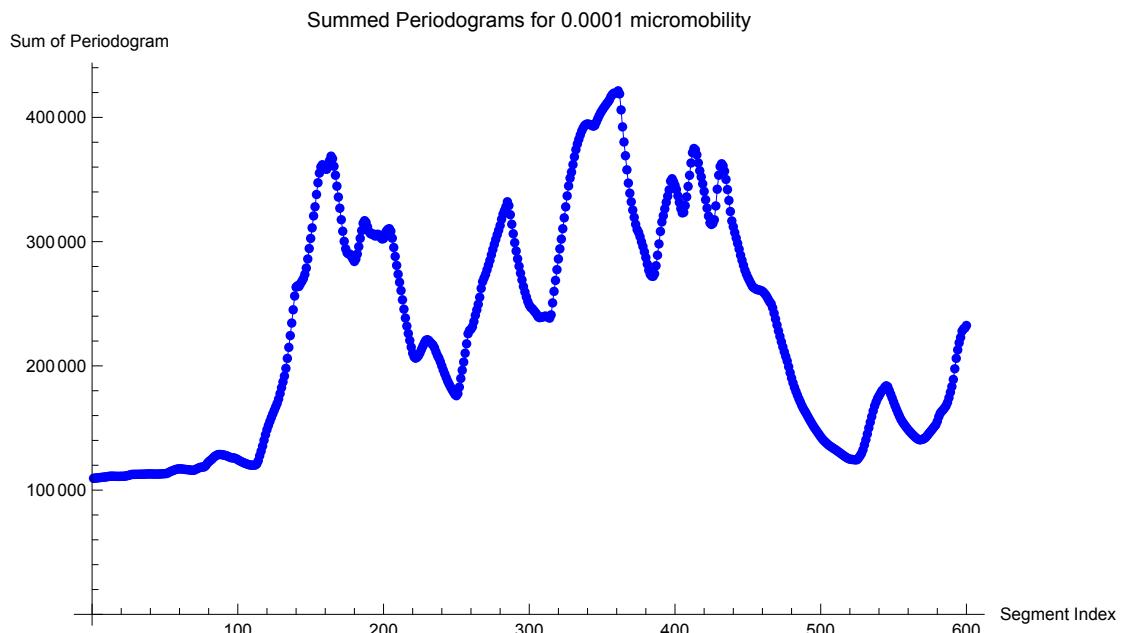
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344 431., 353 383., 363 295., 371 603., 374 970., 373 875., 369 865., 363 379.,
357 052., 352 108., 346 535., 340 439., 333 745., 326 992., 320 564., 315 099.,
313 814., 314 665., 317 584., 328 754., 342 187., 353 460., 360 471., 362 681.,
360 964., 356 659., 350 069., 341 931., 333 158., 324 261., 316 670., 311 989.,
307 302., 302 934., 298 583., 294 010., 289 071., 284 953., 280 932., 276 963.,
273 902., 271 211., 268 785., 266 485., 264 216., 262 968., 262 335., 261 503.,
261 229., 260 990., 260 647., 260 065., 258 881., 257 512., 255 785., 253 551.,
251 558., 249 958., 246 701., 242 349., 237 672., 232 892., 228 164., 223 762.,
219 446., 215 312., 211 379., 207 600., 203 904., 199 300., 194 538., 190 195.,
186 281., 182 658., 179 480., 176 493., 173 562., 170 925., 168 241., 165 786.,
163 796., 161 775., 159 637., 157 486., 155 453., 153 452., 151 445., 149 657.,
147 995., 146 318., 144 604., 142 946., 141 372., 139 999., 138 914., 137 799.,
136 719., 135 742., 134 996., 134 196., 133 401., 132 705., 131 837., 130 996.,
130 144., 129 269., 128 431., 127 569., 126 769., 126 025., 125 379., 124 929.,
124 732., 124 639., 124 482., 124 334., 124 522., 125 899., 127 598., 129 526.,
132 447., 136 426., 140 582., 145 198., 150 014., 154 673., 159 170., 163 711.,
167 773., 170 921., 173 776., 175 846., 177 972., 179 994., 181 049., 182 923.,
183 965., 183 171., 180 277., 177 279., 174 163., 171 007., 167 915., 165 022.,
162 281., 159 575., 157 079., 155 104., 153 369., 151 723., 150 166., 148 687.,
147 283., 145 988., 144 781., 143 631., 142 514., 141 551., 140 821., 140 456.,
140 662., 140 944., 141 486., 142 383., 143 746., 145 243., 146 689., 148 115.,
149 650., 151 135., 152 601., 155 346., 158 997., 161 832., 163 404., 164 626.,
166 128., 167 863., 170 498., 174 331., 178 786., 183 351., 189 081., 197 676.,
206 056., 212 867., 218 580., 222 931., 228 002., 229 737., 230 567., 232 507.}

```

Out[1]=



Out[•] =



```
In[•]:= ListLinePlot[{sumPeriodograms5, sumPeriodograms4 - 114607},
  PlotRange → {{0, 165}, All}, PlotStyle → {BlueGray},
  PlotLabel → "Summed Periodograms for 0.0001 micromobility & blockage",
  PlotLegends → Placed[{"Micro in 0.0001", "Block in 0.0001"}, {0.3, 0.6}]]
```

Out[•] =

