

```
In[1]:= ClearAll["Global`*"]
SetDirectory[
  "/Users/humayrajeba/Documents/Wolfram Mathematica/processed_data_dBm"];
data = Import["updated_racing_7.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]=

```
{-13.7394, -13.7798, -13.835, -13.9243, -13.9963, -14.116, -14.2257, -14.352, -14.4628,
-14.5849, -14.6955, -14.6633, -14.7084, ... 299 976 ..., -28.6544, -28.7025, -28.6805,
-28.6726, -28.6687, -28.6824, -28.6771, -28.6752, -28.6579, -28.6817, -28.6883, -28.6696}
```

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]=

```
{-13.7394, -13.7798, -13.835, -13.9243, -13.9963, -14.116, -14.2257, -14.352, -14.4628,
-14.5849, -14.6955, -14.6633, -14.7084, ... 299 976 ..., -28.6544, -28.7025, -28.6805,
-28.6726, -28.6687, -28.6824, -28.6771, -28.6752, -28.6579, -28.6817, -28.6883, -28.6696}
```

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]
```

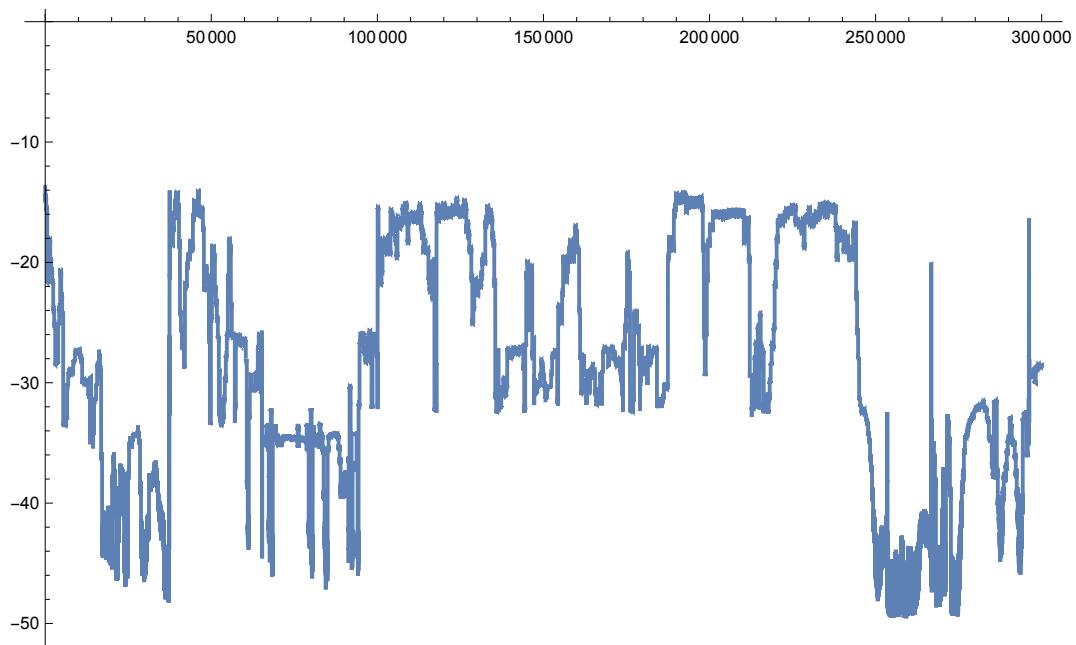
Out[=]=

$\{2.3688 \times 10^8, 3.18904 \times 10^6, 545991., 2.52007 \times 10^6, 472691., 2.12283 \times 10^6, 408247., 160826., 1.0811 \times 10^6, 344395., 57910.2, 57781.6, 43900.7, \dots 299976 \dots, 43900.7, 57781.6, 57910.2, 344395., 1.0811 \times 10^6, 160826., 408247., 2.12283 \times 10^6, 472691., 2.52007 \times 10^6, 545991., 3.18904 \times 10^6\}$

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



Out[=]=



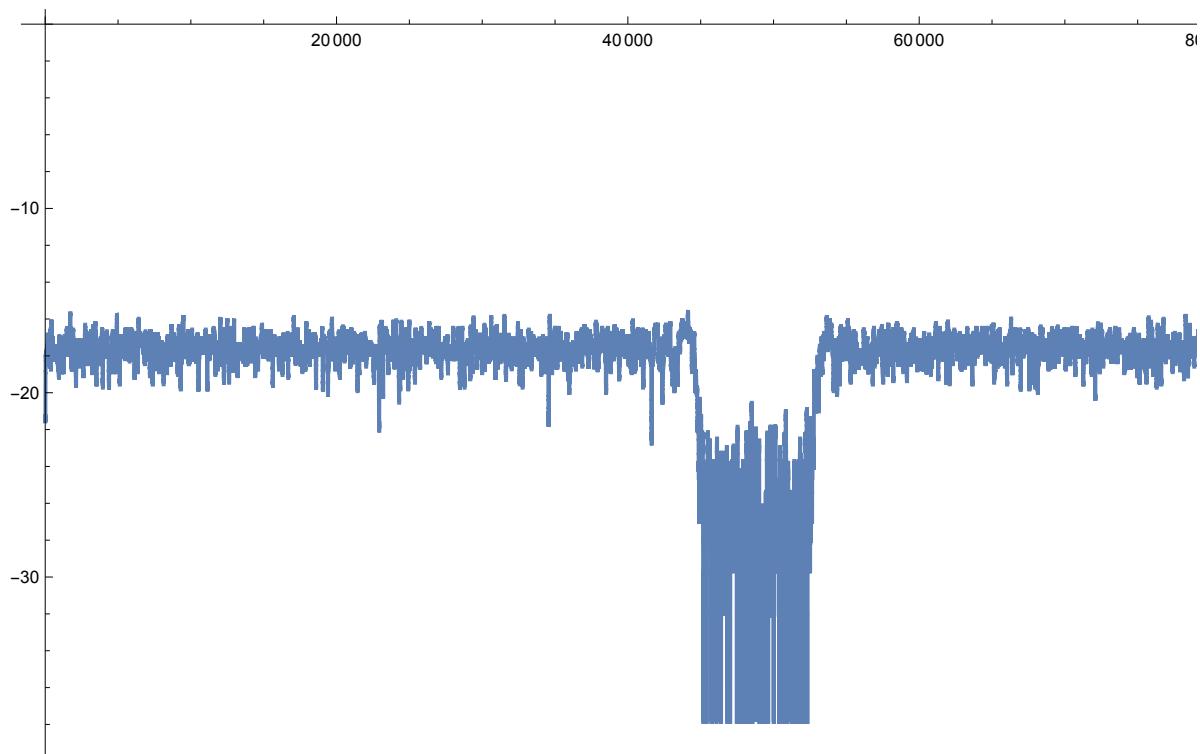
Out[=]=

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

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



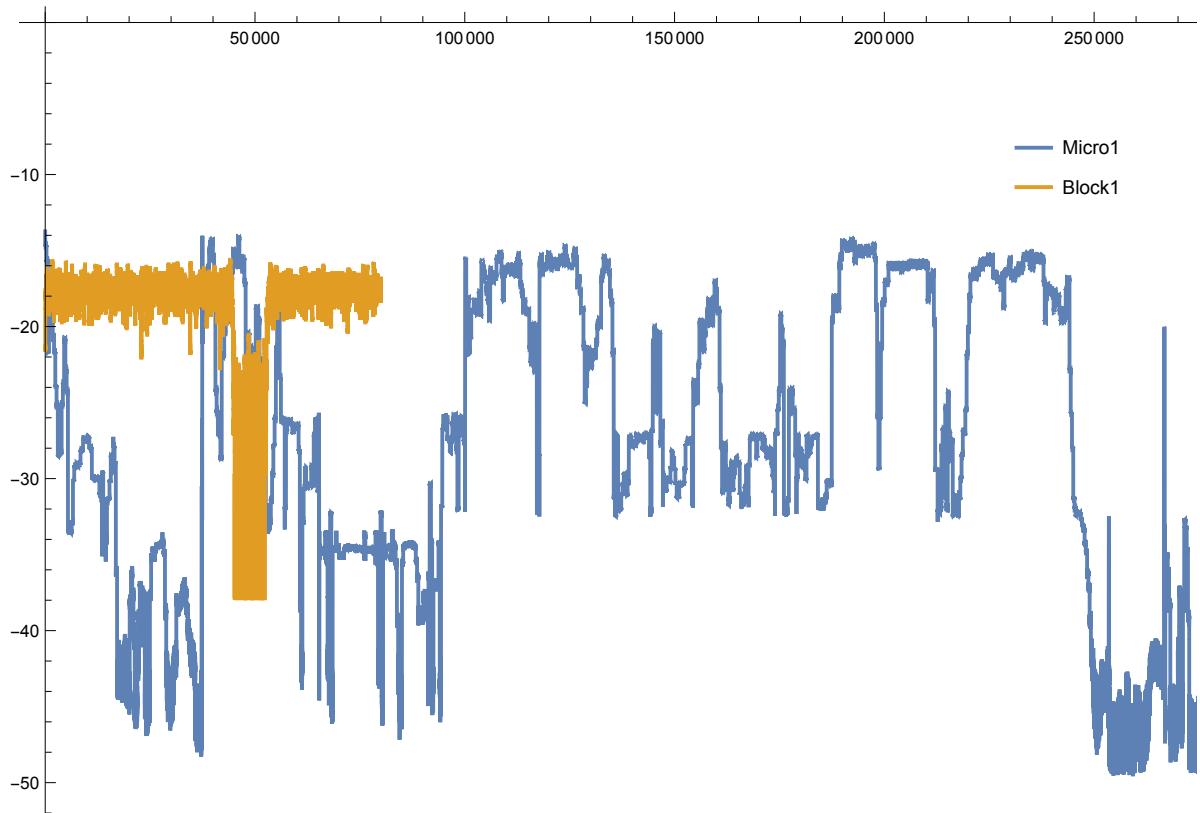
Out[5]=



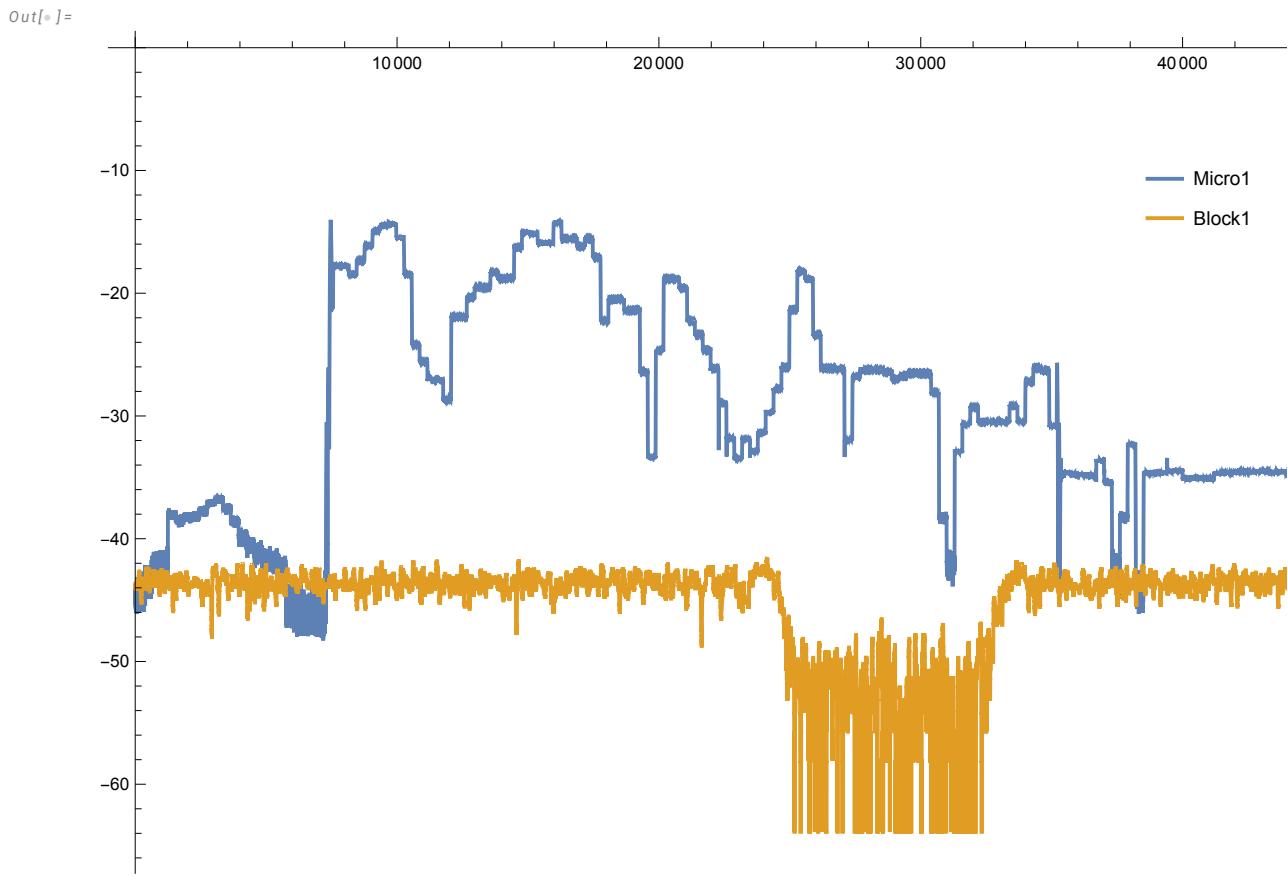
```
In[6]:= microPeriodogram = PeriodogramArray[micro1];
blockPeriodogram = PeriodogramArray[block1];

ListLinePlot[{micro1, block1 + 35}, PlotRange -> All,
PlotLegends -> Placed[{"Micro1", "Block1"}, {0.8, 0.8}]]
```

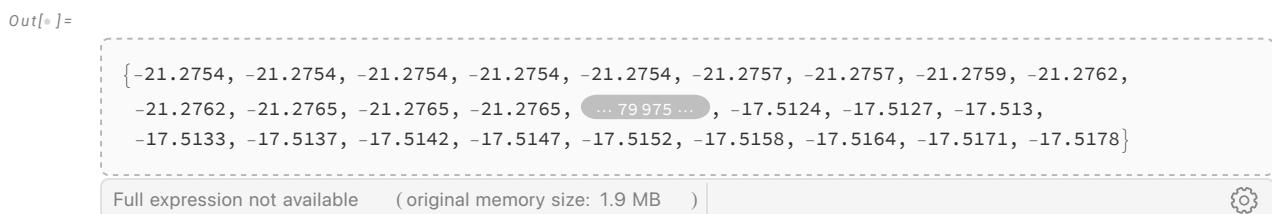
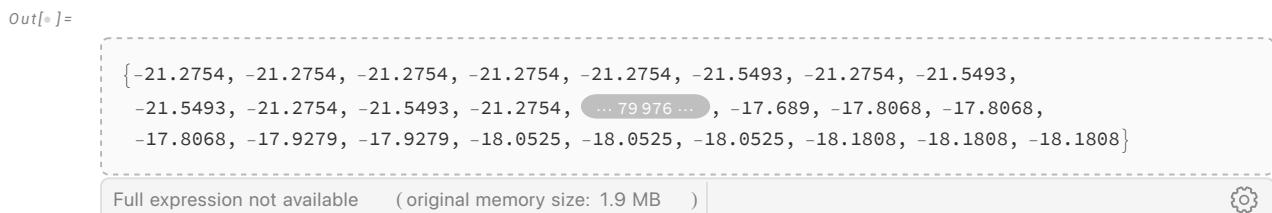
Out[6]=



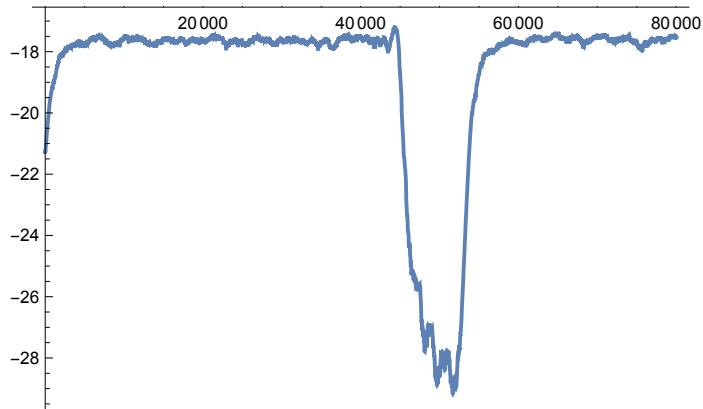
```
In[6]:= ListLinePlot[{micro1[[30 000 ;; 80 000]], block1[[20 000 ;; 70 000]] + 9},
  PlotRange → All, PlotStyle → {BlueGray},
  PlotLegends → Placed[{"Micro1", "Block1"}, {0.8, 0.8}]]
```



```
In[7]:= 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[=]



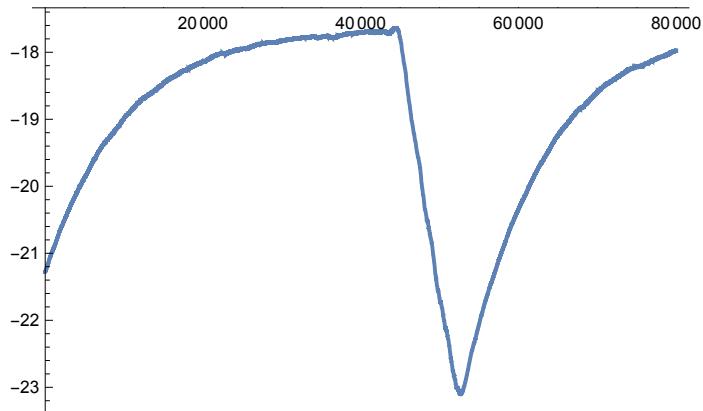
Out[=]

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -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[=]:= movingAvg3 = Re[ExponentialMovingAverage[micromobility, decayRate1]]
ListLinePlot[movingAvg3, PlotRange -> All]
movingAvg4 = Re[ExponentialMovingAverage[micromobility, decayRate2]]
ListLinePlot[movingAvg4, PlotRange -> All]
```

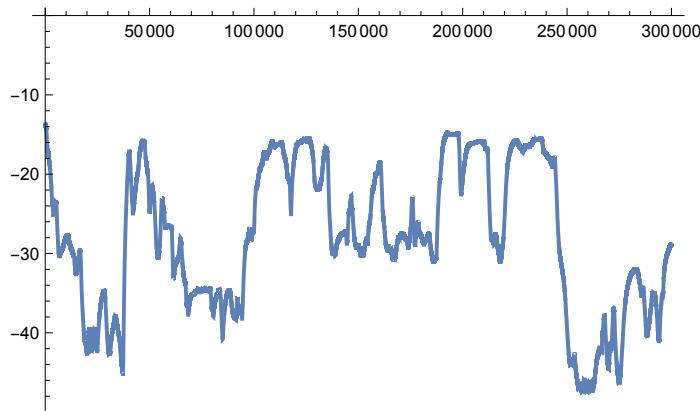
Out[=]=

{-13.7394, -13.7394, -13.7395, -13.7397, -13.74, -13.7404, -13.7408, -13.7414, -13.7422, -13.743, -13.744, -13.7449, ... 299.977 ..., -28.8758, -28.8756, -28.8754, -28.8752, -28.875, -28.8748, -28.8746, -28.8744, -28.8742, -28.874, -28.8738, -28.8736}

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



Out[=]=



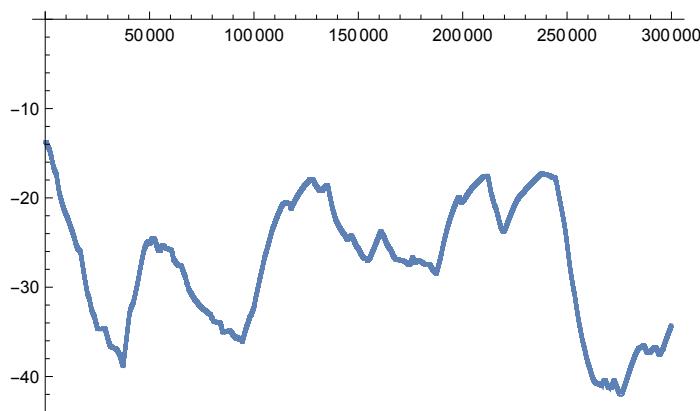
Out[=]=

{-13.7394, -13.7394, -13.7394, -13.7394, -13.7395, -13.7395, -13.7395, -13.7396, -13.7397, -13.7398, -13.7399, -13.7399, -13.74, ... 299.976 ..., -34.3072, -34.3067, -34.3061, -34.3055, -34.305, -34.3044, -34.3038, -34.3033, -34.3027, -34.3022, -34.3016, -34.301}

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

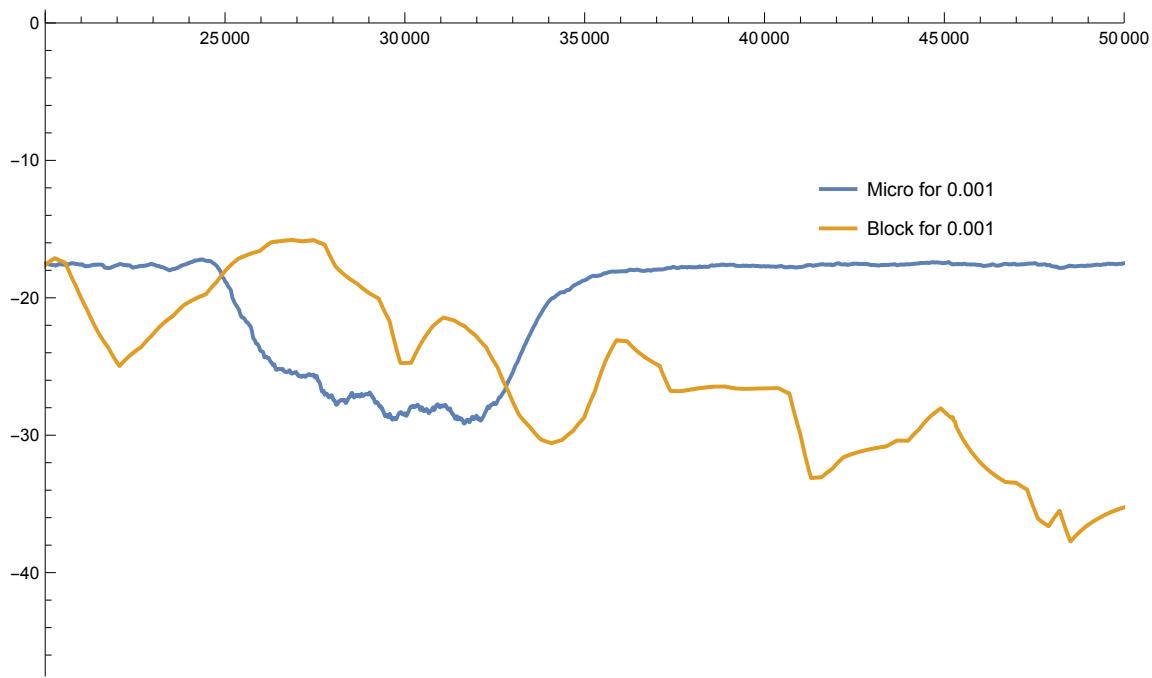


Out[=]=



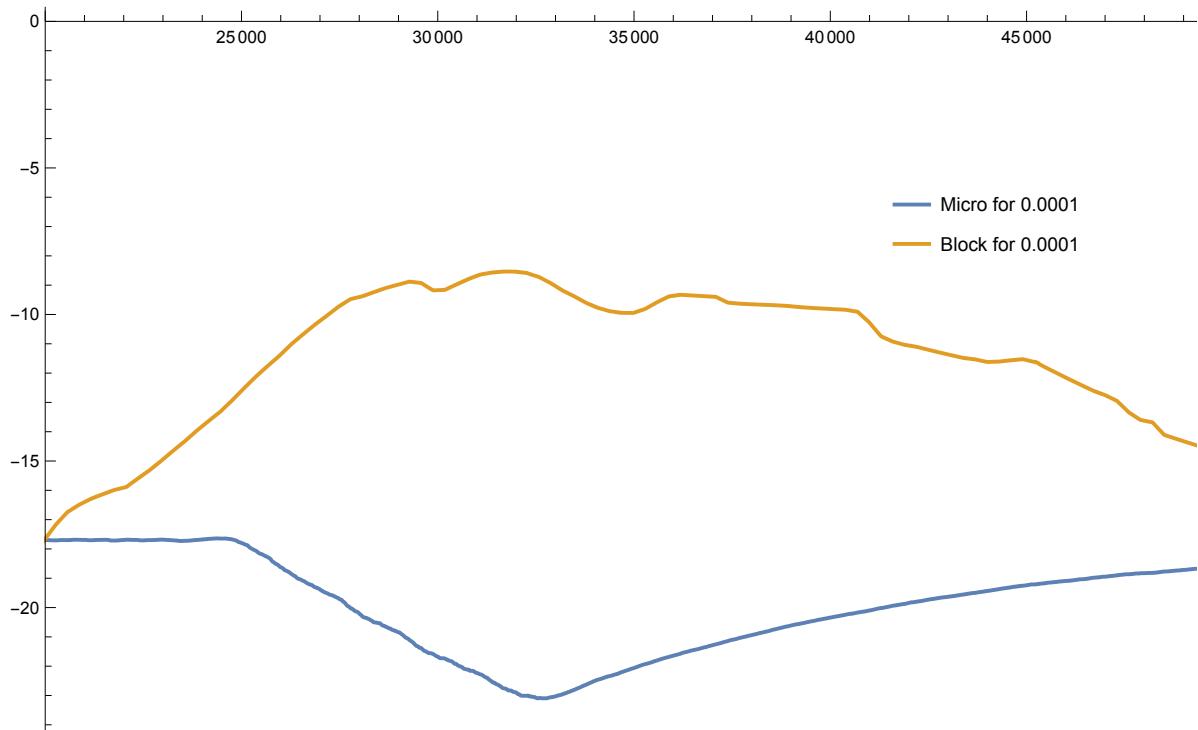
```
In[8]:= ListLinePlot[{movingAvg1[[20 000 ;; 70 000]], movingAvg3[[20 000 ;; 70 000]]},
  PlotRange -> {{20 000, 50 000}, All}, PlotStyle -> {BlueGray},
  PlotLegends -> Placed[{"Micro for 0.001", "Block for 0.001"}, {0.8, 0.7}]]
```

Out[8]=



```
In[9]:= ListLinePlot[{movingAvg2[[20 000 ;; 70 000]], movingAvg4[[20 000 ;; 70 000]] + 16},
  PlotRange -> {{20 000, 50 000}, All}, PlotStyle -> {BlueGray},
  PlotLegends -> Placed[{"Micro for 0.0001", "Block for 0.0001"}, {0.8, 0.7}]]
```

Out[9]=



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

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

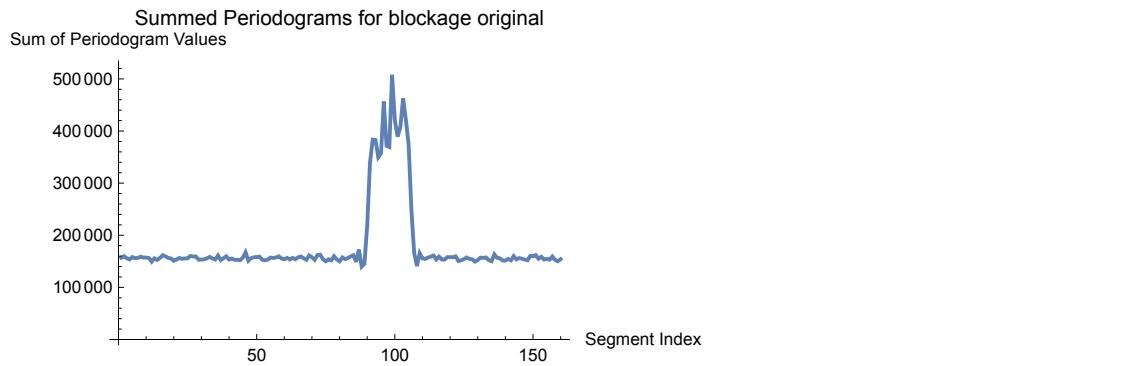
(*Loop through each segment*)
For[i = 1, i ≤ numSegments, i++,
  (*Extract the i^th segment of 500 values*)
  blockSegment = Take[block, {500 * (i - 1) + 1, 500 * i}];
  (*Compute the periodogram for the current segment*)
  periodogram = PeriodogramArray[blockSegment];
  (*Sum up the values of the periodogram*)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

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

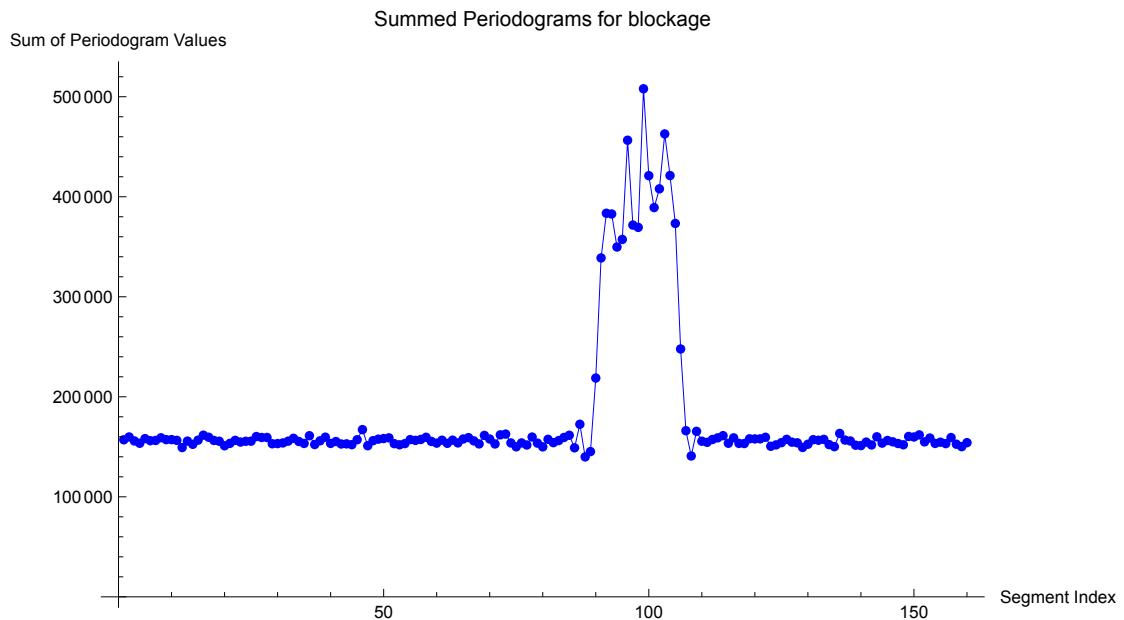
Out[=]= {156999., 159843., 155849., 153551., 158178., 156125., 156326., 159035.,
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159546., 156356., 155529., 151034., 153419., 156424., 154742., 155509.,
155609., 160251., 159306., 159335., 153034., 153201., 153846., 155668.,
158504., 155335., 153345., 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.,
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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

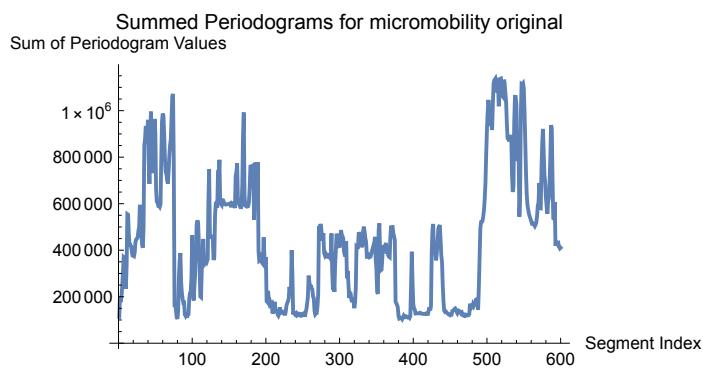
Out[=]= {113359., 201600., 177413., 202525., 240977., 303672., 370491., 367636.,
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418152., 396517., 376882., 376174., 374195., 391153., 434673., 447010.,
449098., 454352., 483378., 498745., 595172., 531857., 477642., 423585.,
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783519., 685221., 872599., 995880., 817098., 731995., 745095., 890708.,
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597090., 788486., 951247., 987399., 977221., 898121., 796919., 736317.,
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1.06291×106, 1.07154×106, 774135., 164732., 164778., 140321., 111745.,
104876., 143472., 286868., 353438., 387631., 262368., 216511., 190565.,
173249., 173994., 123477., 117753., 124946., 110154., 123766., 125712.,
191478., 215730., 222208., 282166., 463663., 222275., 183929., 245625.,
295153., 379206., 505677., 528117., 518994., 434843., 352144., 200747.,
197917., 316748., 342116., 448466., 350816., 344021., 351658., 359900.,
351953., 361377., 604662., 747408., 473311., 451076., 464400., 455347.,
448023., 358114., 369460., 546952., 601982., 604674., 582472., 726070.,
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356583., 377850., 387621., 344903., 340833., 455345., 372192., 340775.,
369920., 180605., 176773., 225098., 183256., 170131., 176934., 167617.,
170845., 127863., 138437., 153203., 178157., 140292., 142094., 139111.}
```

123 032., 118 122., 126 174., 154 410., 133 385., 131 241., 130 720., 134 043.,
 130 364., 132 557., 119 968., 136 982., 162 879., 172 683., 180 509., 193 541.,
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 171 156., 199 057., 290 599., 263 971., 241 122., 250 420., 236 067., 232 544.,
 200 630., 194 373., 138 882., 124 085., 127 914., 129 526., 157 182., 211 962.,
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 379 273., 386 807., 380 878., 371 637., 371 487., 376 683., 373 910., 368 317.,
 375 263., 471 715., 310 041., 229 178., 278 061., 220 768., 338 218., 403 918.,
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 460 417., 448 739., 395 199., 378 958., 378 364., 437 581., 279 420., 310 638.,
 257 500., 194 757., 217 638., 213 787., 186 762., 177 881., 195 067., 179 187.,
 150 789., 173 921., 238 744., 413 905., 410 482., 411 883., 477 057., 469 464.,
 448 226., 434 967., 413 216., 420 642., 484 354., 501 262., 478 233., 450 359.,
 436 152., 371 293., 371 041., 375 195., 387 978., 370 537., 372 166., 383 891.,
 397 152., 408 321., 399 868., 426 022., 457 512., 363 030., 318 490., 219 549.,
 212 456., 485 686., 515 408., 394 791., 313 568., 316 503., 364 822., 421 666.,
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 369 571., 461 783., 504 992., 498 484., 498 944., 472 405., 458 367., 442 528.,
 178 546., 172 020., 164 996., 154 184., 116 326., 105 866., 107 198., 109 699.,
 108 658., 103 666., 110 184., 117 619., 111 829., 111 960., 115 268., 112 485.,
 110 941., 113 539., 113 070., 109 258., 116 740., 245 015., 393 348., 265 367.,
 169 246., 149 778., 145 361., 127 855., 128 307., 128 477., 128 424., 128 261.,
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 126 357., 127 760., 125 546., 126 025., 126 061., 142 294., 154 310., 141 275.,
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 124 029., 123 645., 120 707., 123 728., 123 402., 138 397., 139 576., 142 423.,
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 119 447., 120 982., 119 821., 120 197., 124 661., 170 053., 159 855., 152 585.,
 155 808., 166 924., 159 702., 166 807., 171 826., 186 914., 188 372., 169 952.,
 143 886., 240 083., 363 636., 491 394., 520 483., 520 797., 525 931., 545 365.,
 573 502., 622 479., 693 282., 815 135., 919 396., 995 355., 1.0464×10^6 ,
 1.01149×10^6 , 957 195., 944 444., 945 275., 916 835., 1.02894×10^6 , 1.11551×10^6 ,
 1.13079×10^6 , 1.13551×10^6 , 1.09633×10^6 , 1.07928×10^6 , 1.12915×10^6 ,
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 1.09457×10^6 , 1.06328×10^6 , 1.059×10^6 , 1.1331×10^6 , 1.1194×10^6 , 1.07505×10^6 ,
 1.03842×10^6 , 944 968., 882 524., 880 812., 867 976., 878 820., 883 402.,
 895 294., 726 081., 650 198., 673 595., 951 332., 1.05941×10^6 , 1.05925×10^6 ,
 1.02366×10^6 , 783 166., 822 173., 817 289., 544 050., 639 156., 988 463.,
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 730 821., 638 705., 593 384., 573 875., 556 472., 545 317., 535 615., 525 919.,
 514 985., 516 338., 514 130., 508 758., 503 448., 510 014., 519 681., 546 911.,
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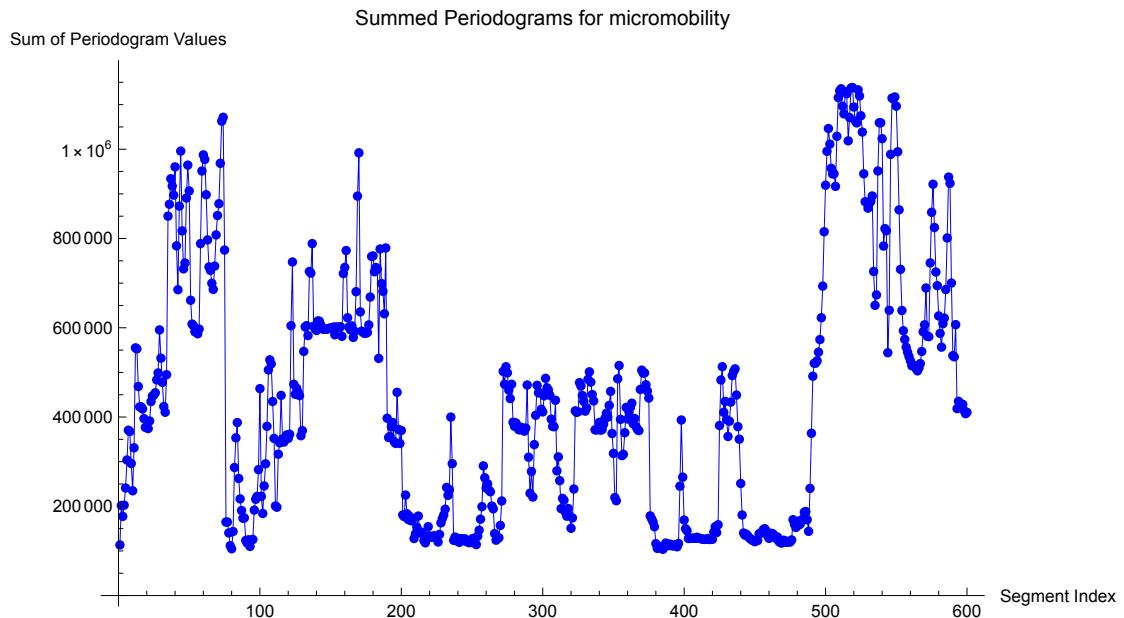
```
824 597., 724 871., 694 326., 626 505., 587 379., 556 613., 609 163., 621 664.,
685 669., 801 149., 937 712., 923 757., 700 242., 537 530., 534 920., 606 939.,
418 908., 435 301., 431 216., 425 279., 428 467., 414 120., 407 478., 410 537.}
```

```
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[=]=

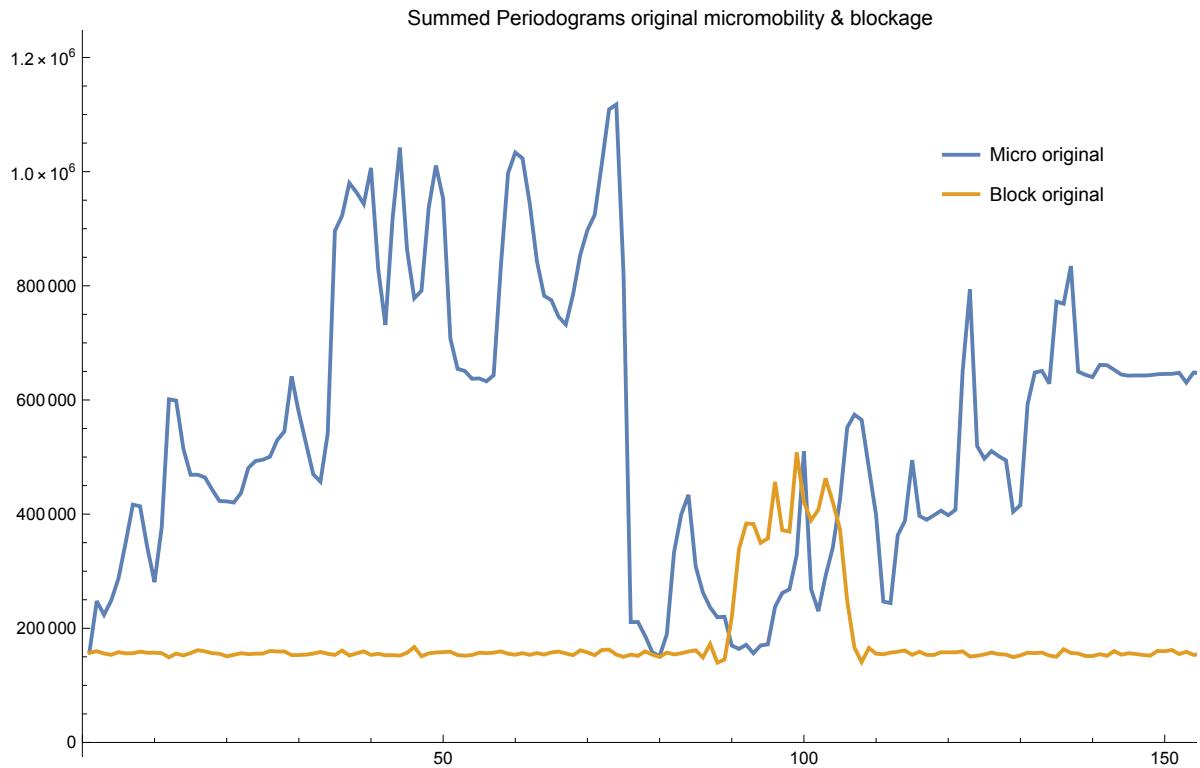


Out[=]=



```
In[]:= ListLinePlot[{sumPeriodograms1 + 46152, sumPeriodograms},  
PlotRange -> {{0, 163}, All}, PlotStyle -> {BlueGray},  
PlotLabel -> "Summed Periodograms original micromobility & blockage",  
PlotLegends -> Placed[{"Micro original", "Block original"}, {0.8, 0.8}]]
```

Out[]=



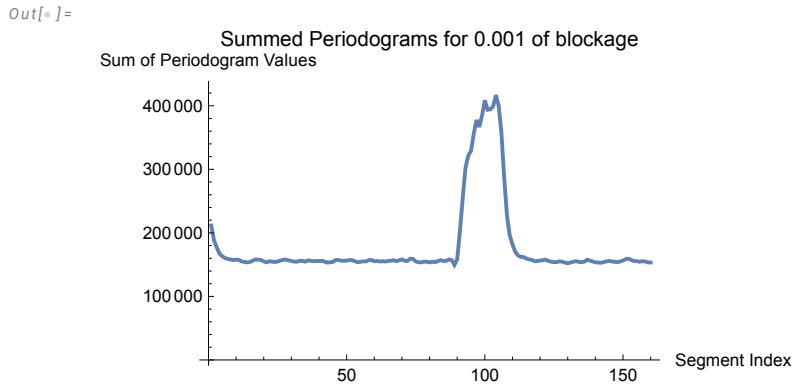
```
In[8]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for blockage*)
sumPeriodograms2 = {};

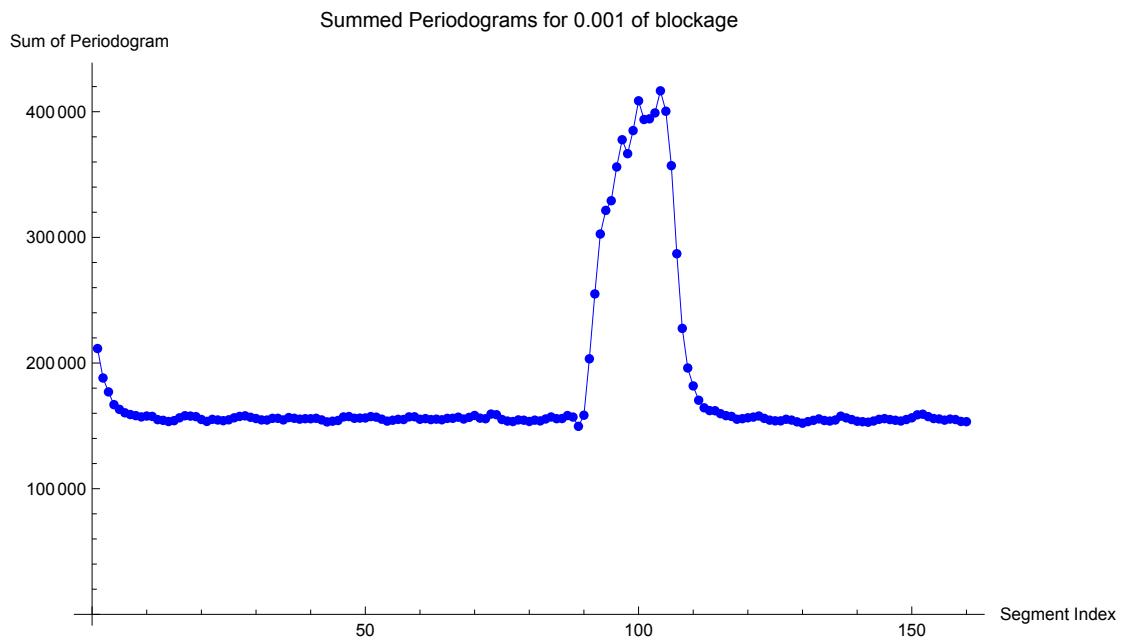
(*Calculate the number of segments*)
numSegments2 = Quotient[Length[movingAvg1], 500];

(*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[=] = {211545., 188097., 177028., 166887., 163123., 160396., 158995., 158134.,
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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[\circ] =

```
In[8]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for micromobility*)
sumPeriodograms3 = {};

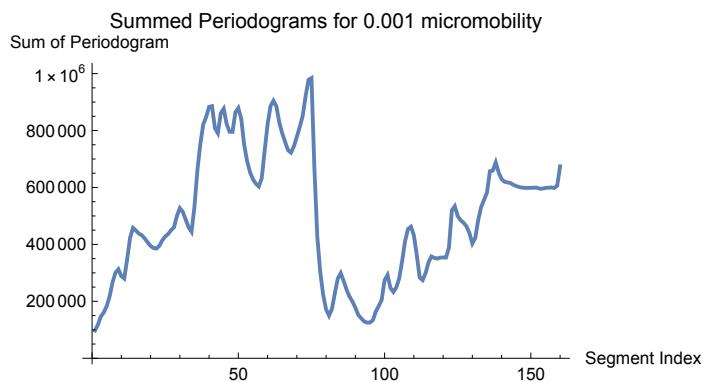
(*Calculate the number of segments*)
numSegments3 = Quotient[Length[movingAvg3], 500];

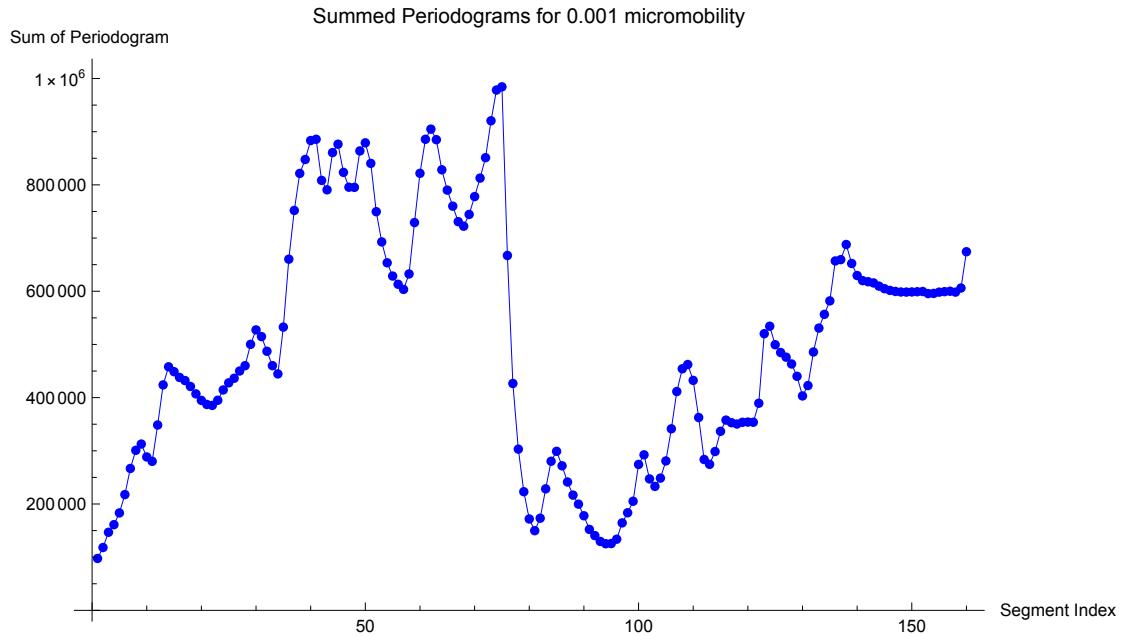
(*Loop through each segment*)
For[i = 1, i ≤ numSegments2, i++,
(*Extract the i^th segment of 500 values*)
blockSegment3 = Take[movingAvg3, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram3 = PeriodogramArray[blockSegment3];
(*Sum up the values of the periodogram*)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

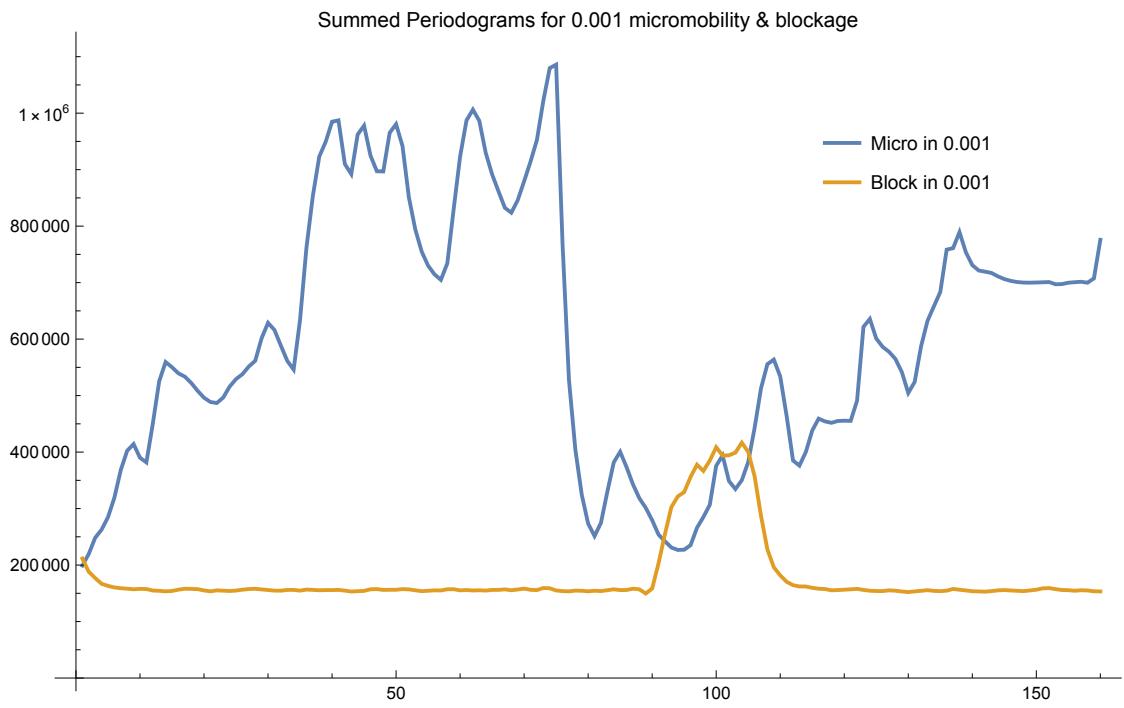
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427766., 436356., 450024., 460077., 500173., 527336., 514759., 487158.,
460113., 444573., 532573., 660313., 751935., 821572., 847732., 883407.,
885774., 808432., 790672., 860705., 876474., 823522., 795626., 795292.,
863813., 879030., 840400., 749579., 692790., 653483., 628562., 613138.,
603438., 632524., 729138., 821724., 885714., 904800., 884953., 828364.,
790130., 760014., 730865., 722311., 744449., 778006., 812765., 851136.,
920538., 978333., 984380., 667260., 426570., 303122., 223078., 171806.,
149808., 173271., 228461., 280322., 299001., 271796., 241326., 216714.,
199718., 177877., 152244., 140560., 129567., 125276., 125643., 133770.,
164499., 183520., 205127., 274306., 292439., 247138., 233052., 248644.,
280933., 341365., 411456., 454197., 462267., 432408., 362592., 283654.,
274557., 298625., 336681., 357732., 352819., 350319., 353596., 354033.,
353720., 389421., 520184., 534219., 499493., 484777., 476051., 463272.,
440057., 403154., 422667., 485765., 530722., 556540., 581901., 656988.,
659443., 687896., 652183., 629537., 619965., 617937., 615616., 609621.,
604826., 601599., 599603., 598576., 598429., 598694., 599111., 599503.,
595596., 595950., 598318., 599257., 600002., 598362., 606048., 674303.}
```

Out[=] =



Out[\circ] =

```
In[ $\circ$ ] := 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"}, {0.8, 0.8}]]
```

Out[\circ] =

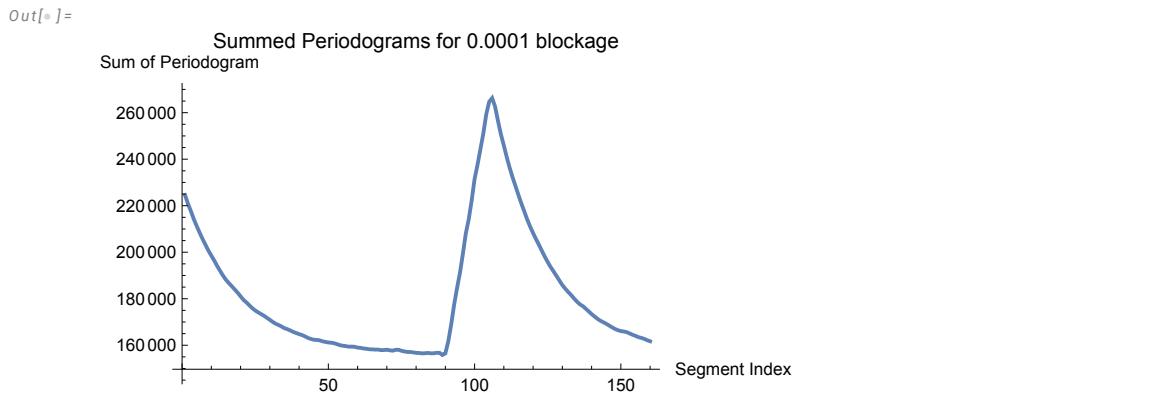
```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.0001 decay rate for blockage*)
sumPeriodograms4 = {};

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

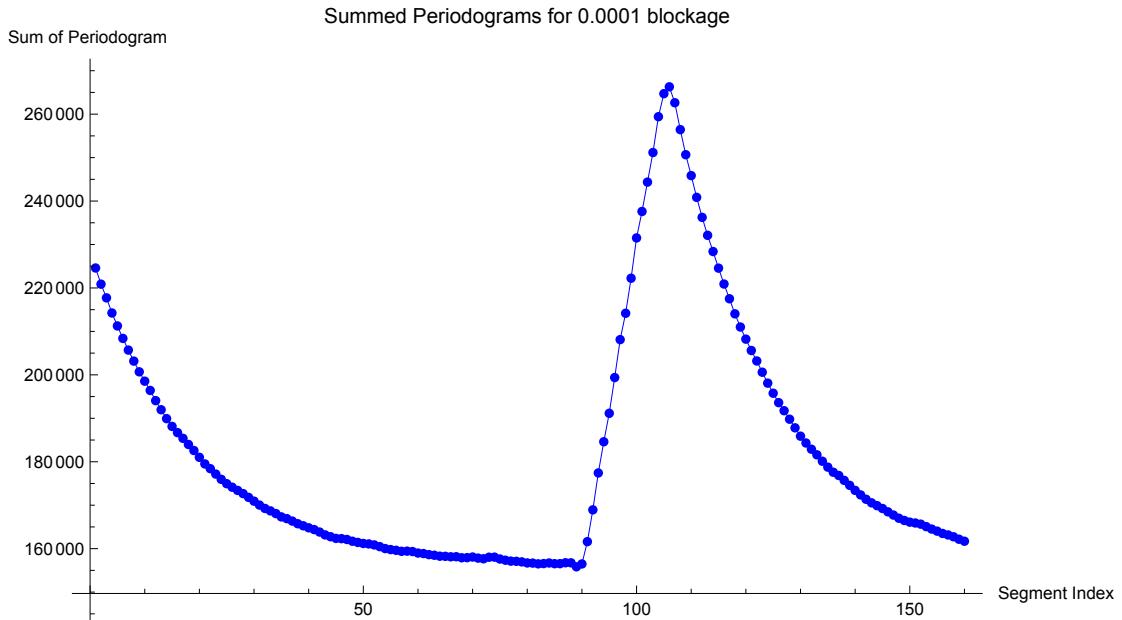
(*Loop through each segment*)
For[i = 1, i ≤ numSegments4, i++,
(*Extract the i^th segment of 500 values*)
blockSegment4 = Take[movingAvg2, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram4 = PeriodogramArray[blockSegment4];
(*Sum up the values of the periodogram*)
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[8]= {224595., 220873., 217723., 214243., 211257., 208389., 205702., 203166.,
200697., 198544., 196413., 194067., 191968., 189922., 188138., 186701.,
185382., 183975., 182586., 181021., 179499., 178407., 177166., 175956.,
174949., 174140., 173402., 172669., 171802., 170928., 170027., 169252.,
168691., 168070., 167310., 166910., 166345., 165737., 165268., 164797.,
164387., 163819., 163166., 162743., 162361., 162301., 162110., 161703.,
161429., 161191., 161084., 160859., 160464., 160015., 159785., 159615.,
159384., 159425., 159333., 158989., 158867., 158623., 158479., 158263.,
158232., 158126., 158142., 157901., 157926., 158070., 157819., 157669.,
158026., 158046., 157616., 157335., 157122., 157085., 156953., 156710.,
156674., 156501., 156566., 156697., 156539., 156544., 156752., 156740.,
155821., 156480., 161610., 168925., 177424., 184603., 191149., 199380.,
208111., 214173., 222238., 231512., 237604., 244363., 251169., 259417.,
264720., 266293., 262631., 256436., 250670., 245861., 240849., 236242.,
232111., 228385., 224560., 220903., 217513., 214041., 211008., 208220.,
205604., 203199., 200606., 198093., 195769., 193607., 191750., 189791.,
187810., 185886., 184319., 182886., 181600., 180118., 178756., 177586.,
176841., 175706., 174570., 173407., 172368., 171366., 170546., 169897.,
169241., 168470., 167731., 167002., 166485., 166098., 165908., 165640.,
165071., 164511., 164031., 163494., 163155., 162735., 162168., 161706.}
```



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]

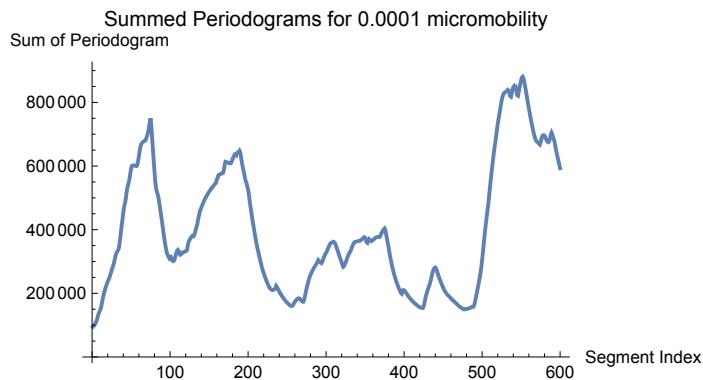
Out[=]=
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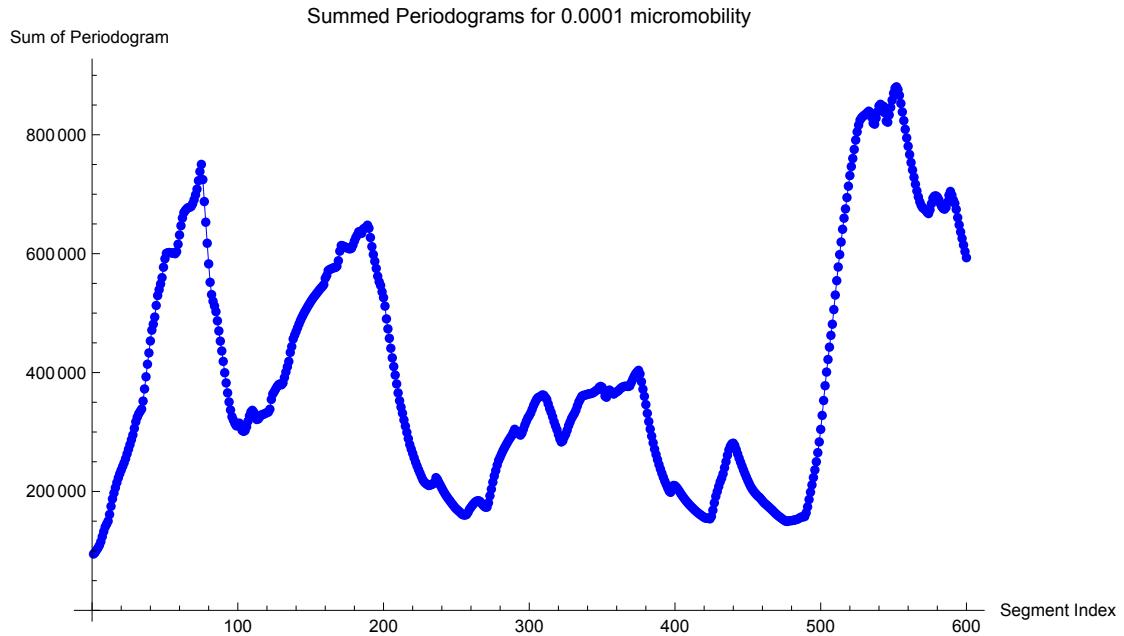
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 577 142., 591 396., 600 520., 601 544., 601 948., 601 641., 601 125., 600 578.,
 599 972., 603 357., 615 829., 631 409., 647 010., 659 947., 669 023., 672 715.,
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 436 302., 418 755., 399 713., 382 554., 365 804., 350 576., 337 028., 325 745.,
 319 936., 314 301., 310 361., 314 047., 314 955., 307 863., 302 648., 301 103.,
 302 535., 308 664., 318 155., 327 025., 333 725., 336 423., 333 110., 324 657.,
 321 118., 321 878., 325 238., 328 544., 329 363., 330 176., 331 523., 332 649.,
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 381 022., 379 455., 382 588., 391 642., 400 931., 409 652., 418 780., 433 864.,
 443 803., 456 523., 463 028., 469 107., 475 317., 481 705., 487 715., 492 954.,
 497 822., 502 434., 506 836., 511 062., 515 149., 519 096., 522 895., 526 534.,
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 563 122., 571 545., 573 229., 574 392., 575 481., 576 534., 576 729., 578 815.,
 588 110., 604 273., 613 720., 613 124., 612 003., 610 854., 609 700., 608 671.,
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 511 759., 490 306., 473 497., 457 630., 440 891., 424 752., 410 110., 395 766.,
 380 846., 365 815., 352 698., 341 878., 331 649., 320 288., 309 868., 299 440.,
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 161 285., 164 995., 170 025., 173 400., 176 839., 179 730., 182 330., 183 913.,
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 263 378., 268 747., 273 494., 277 943., 282 299., 286 557., 290 417., 294 002.,
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 311 921., 318 142., 323 608., 327 492., 332 116., 338 300., 344 581., 349 835.,
 354 782., 357 938., 359 123., 360 053., 362 366., 361 672., 358 241., 354 899.,
 347 306., 339 408., 333 048., 325 707., 317 446., 310 426., 303 895., 295 843.,
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 369 179., 371 691., 374 110., 375 546., 376 557., 377 056., 376 943., 376 611.,
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421995., 442739., 462584., 481341., 505924., 530395., 554569., 577564.,
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746524., 760169., 775325., 791044., 804873., 816267., 824605., 828589.,
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674838., 677948., 686819., 698344., 704652., 698468., 690193., 684526.,
674460., 660584., 648387., 636511., 625629., 614574., 603573., 593230.}
```

Out[1]=



Out[\circ] =

```
In[ $\circ$ ] = ListLinePlot[{sumPeriodograms5, sumPeriodograms4 - 125900},
  PlotRange → {{0, 165}, All}, PlotStyle → {BlueGray},
  PlotLabel → "Summed Periodograms for 0.0001 micromobility & blockage",
  PlotLegends → Placed[{"Micro in 0.0001", "Block in 0.0001"}, {0.2, 0.8}]]
```

Out[\circ] =