

```
In[1]:= ClearAll["Global`*"]
SetDirectory[
  "/Users/humayrajeba/Documents/Wolfram Mathematica/processed_data_dBm"];
data = Import["updated_racing_6.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]=

```
{-14.1613, -14.1669, -14.1895, -14.2339, -14.2142, -14.2625, -14.2806, -14.2724, -14.2393,
-14.2967, -14.2765, -14.2557, -14.262, ... 299.976 ..., -34.1385, -34.1184, -34.1588,
-34.1056, -34.1055, -33.9771, -34.1261, -34.1474, -34.1056, -34.0769, -34.1143, -34.1613}
```

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, 2.35756×10-6, 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]=

```
{-14.1613, -14.1669, -14.1895, -14.2339, -14.2142, -14.2625, -14.2806, -14.2724, -14.2393,
-14.2967, -14.2765, -14.2557, -14.262, ... 299.976 ..., -34.1385, -34.1184, -34.1588,
-34.1056, -34.1055, -33.9771, -34.1261, -34.1474, -34.1056, -34.0769, -34.1143, -34.1613}
```

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]
```

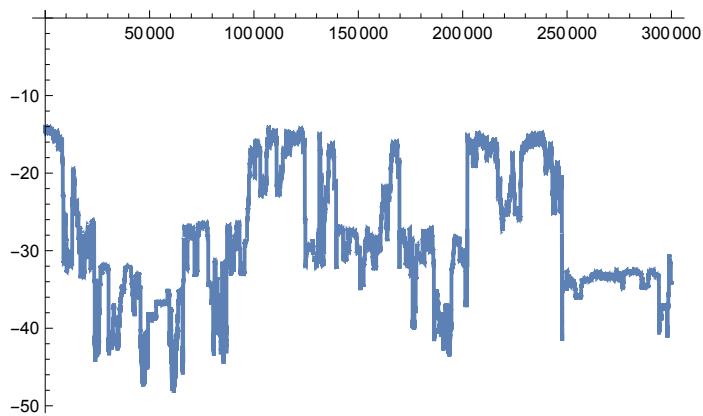
Out[=]=

$\{2.39938 \times 10^8, 1.30141 \times 10^6, 713486., 2.29756 \times 10^6, 577900., 295080., 455259., 22375.2, 68402.7,$   
 $1.04847 \times 10^6, 12560.4, 31267.1, 40285.6, \dots 299975 \dots, 350816., 40285.6, 31267.1, 12560.4,$   
 $1.04847 \times 10^6, 68402.7, 22375.2, 455259., 295080., 577900., 2.29756 \times 10^6, 713486., 1.30141 \times 10^6\}$

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



Out[=]=



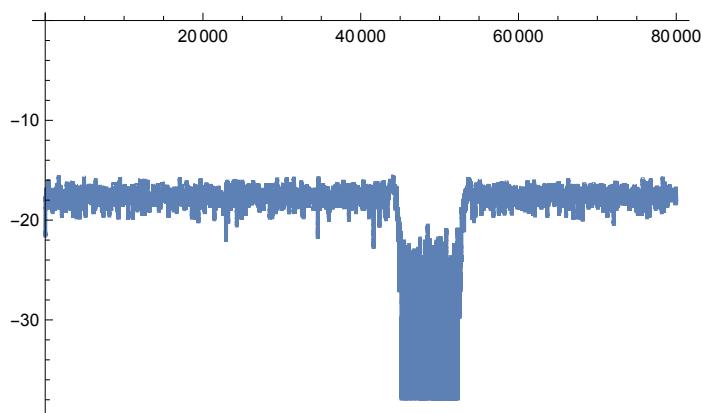
Out[=]=

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

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



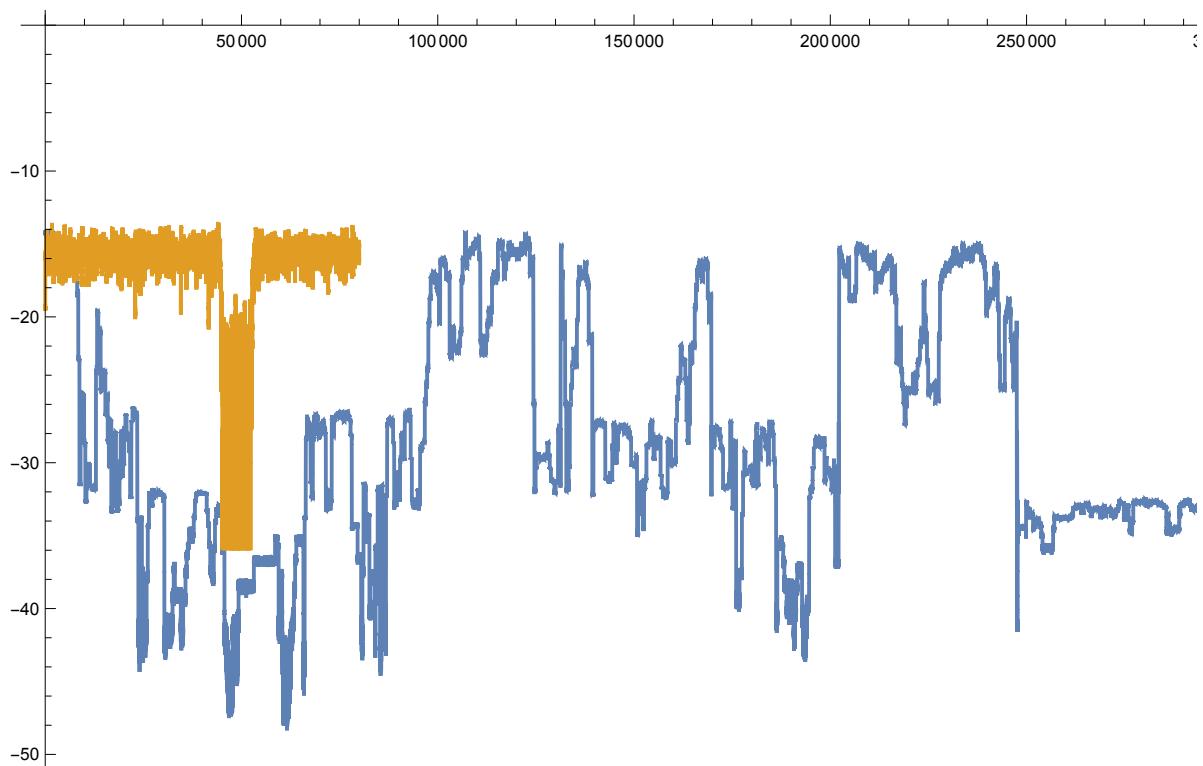
Out[=]=



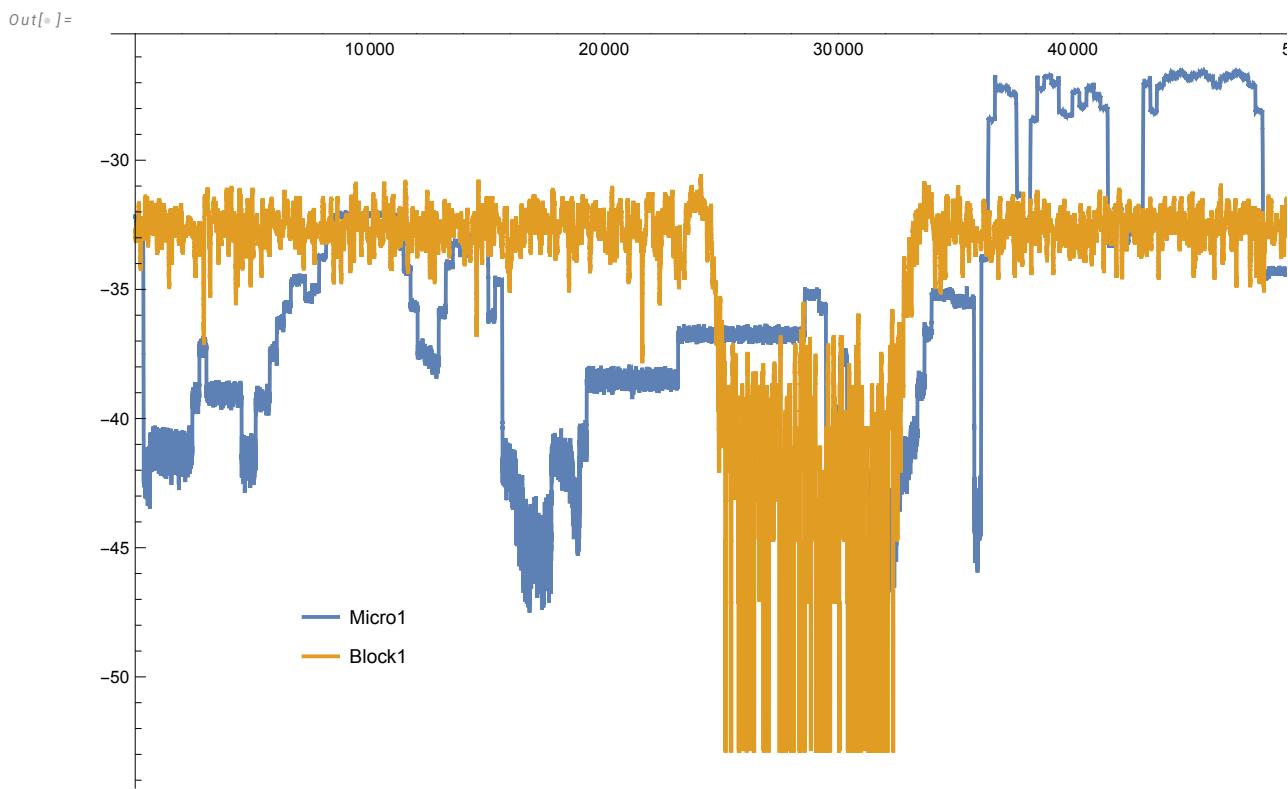
```
In[6]:= microPeriodogram = PeriodogramArray[micro1];
blockPeriodogram = PeriodogramArray[block1];

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

Out[6]=



```
In[4]:= ListLinePlot[{micro1[[30000 ;; 80000]], block1[[20000 ;; 70000]] + 20},
  PlotRange -> All, PlotStyle -> {Blue, Gray},
  PlotLegends -> Placed[{"Micro1", "Block1"}, {0.2, 0.2}]]
```



```
In[5]:= 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[5]=

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.5493, -21.2754, -21.5493,
-21.5493, -21.2754, -21.5493, -21.2754, ... 79.976 ..., -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 )



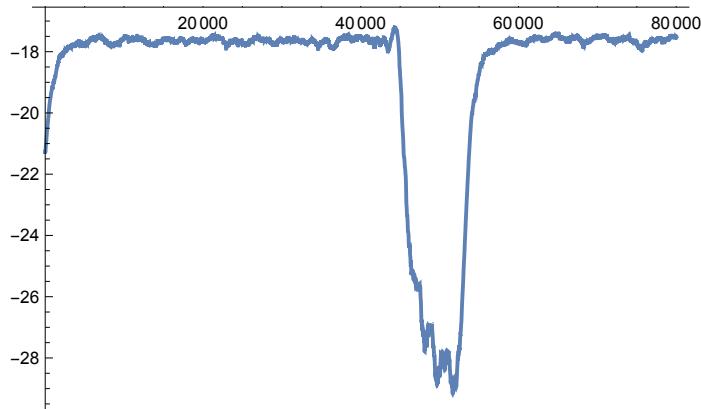
Out[5]=

```
{-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, ... 79.975 ..., -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[=]



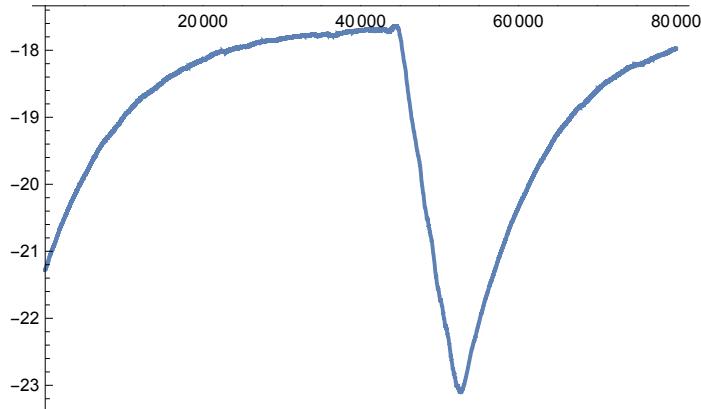
Out[=]

```
{-21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2754, -21.2755,
-21.2755, -21.2755, -21.2755, -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[6]:= movingAvg3 = Re[ExponentialMovingAverage[micromobility, decayRate1]]
ListLinePlot[movingAvg3, PlotRange -> All]
movingAvg4 = Re[ExponentialMovingAverage[micromobility, decayRate2]]
ListLinePlot[movingAvg4, PlotRange -> All]
```

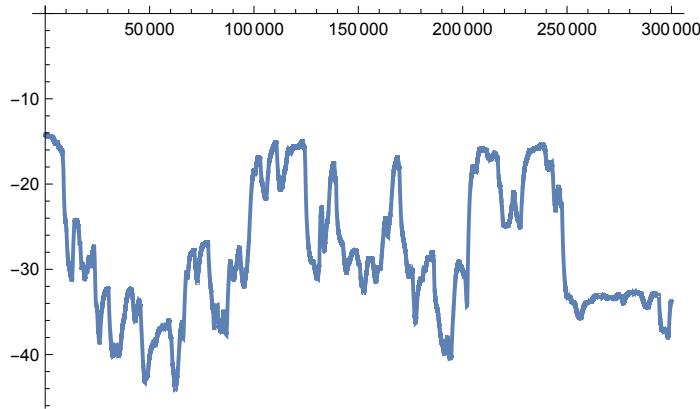
Out[6]=

```
{-14.1613, -14.1613, -14.1613, -14.1614, -14.1614, -14.1615, -14.1616, -14.1618, -14.1618,
-14.162, -14.1621, -14.1622, -14.1623, ... 299.976 ..., -33.8503, -33.8506, -33.8509,
-33.8511, -33.8514, -33.8515, -33.8518, -33.8521, -33.8523, -33.8526, -33.8528, -33.8531}
```

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



Out[6]=



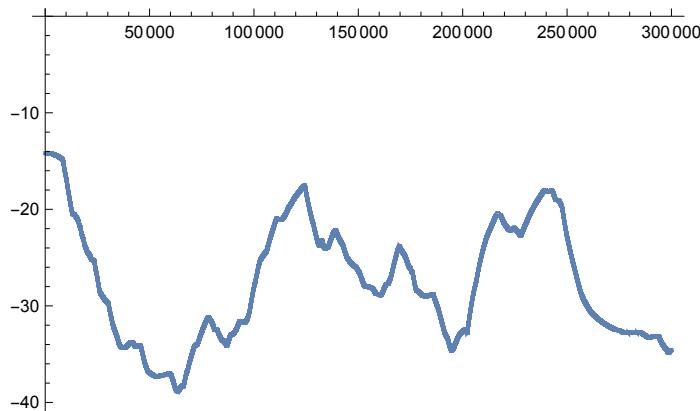
Out[6]=

```
{-14.1613, -14.1613, -14.1613, -14.1613, -14.1613, -14.1613, -14.1613, -14.1613,
-14.1613, -14.1613, -14.1614, -14.1614, ... 299.977 ..., -34.5554, -34.5554, -34.5554,
-34.5553, -34.5553, -34.5552, -34.5552, -34.5551, -34.5551, -34.555, -34.555, -34.5549}
```

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

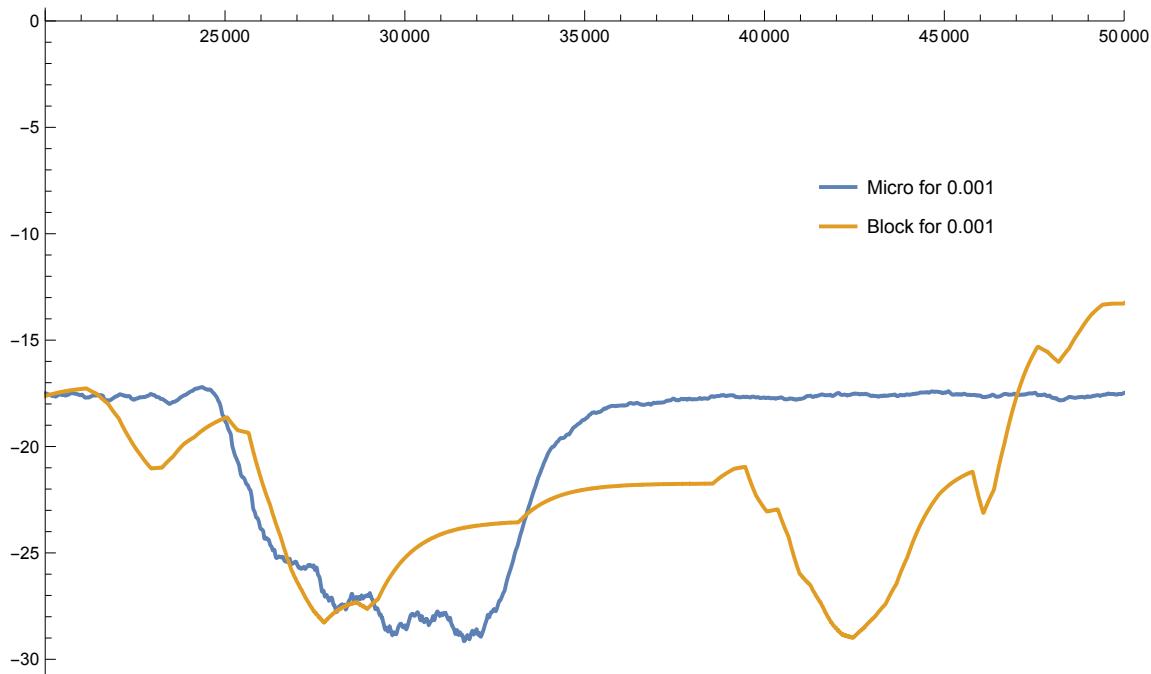


Out[6]=



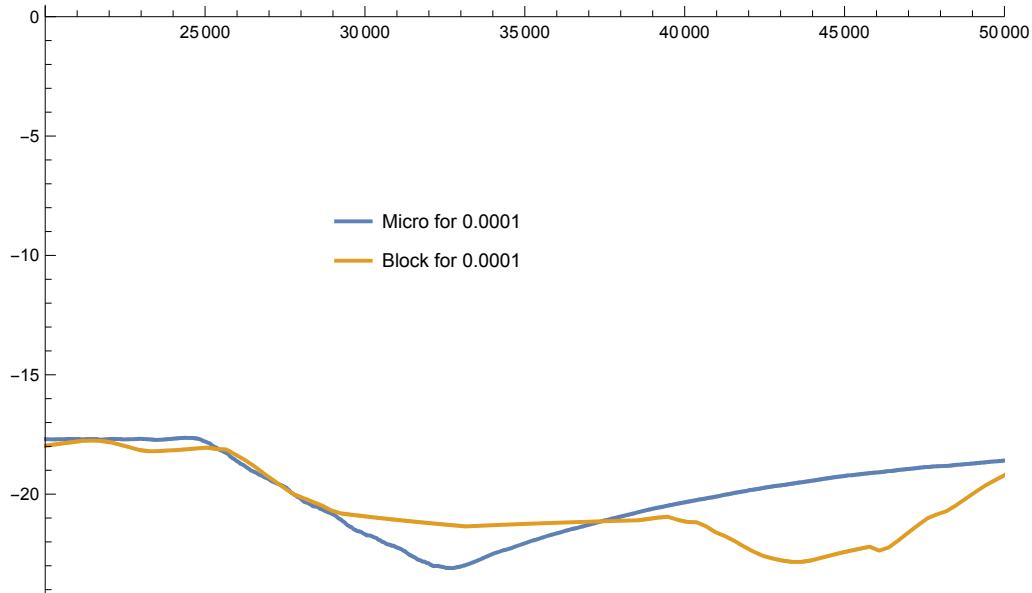
```
In[6]:= ListLinePlot[{movingAvg1[[20 000 ;; 70 000]], movingAvg3[[20 000 ;; 70 000]] + 15},
  PlotRange → {{20 000, 50 000}, All}, PlotStyle → {BlueGray},
  PlotLegends → Placed[{"Micro for 0.001", "Block for 0.001"}, {0.8, 0.7}]]
```

Out[6]=



```
In[7]:= 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"}, {0.4, 0.6}]]
```

Out[7]=



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

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

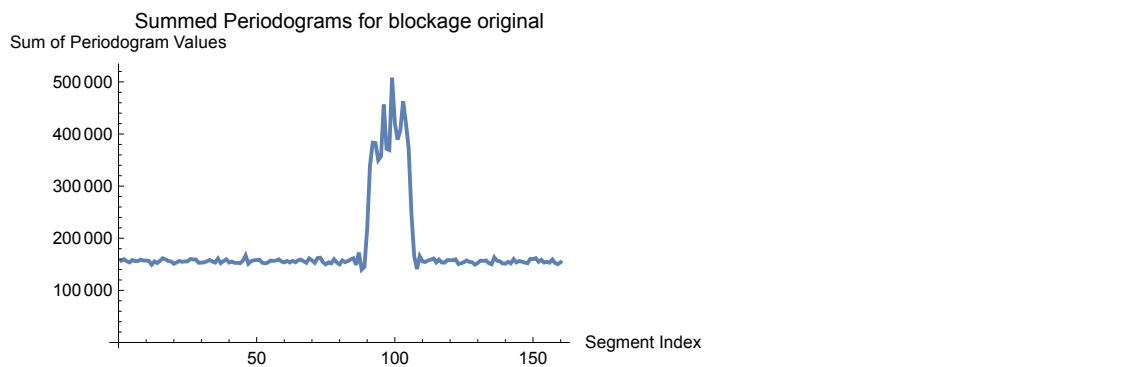
(*Loop through each segment*)
For[i = 1, i ≤ numSegments, i++,
  (*Extract the i^th segment of 500 values*)
  blockSegment = Take[block, {500 * (i - 1) + 1, 500 * i}];
  (*Compute the periodogram for the current segment*)
  periodogram = PeriodogramArray[blockSegment];
  (*Sum up the values of the periodogram*)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

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

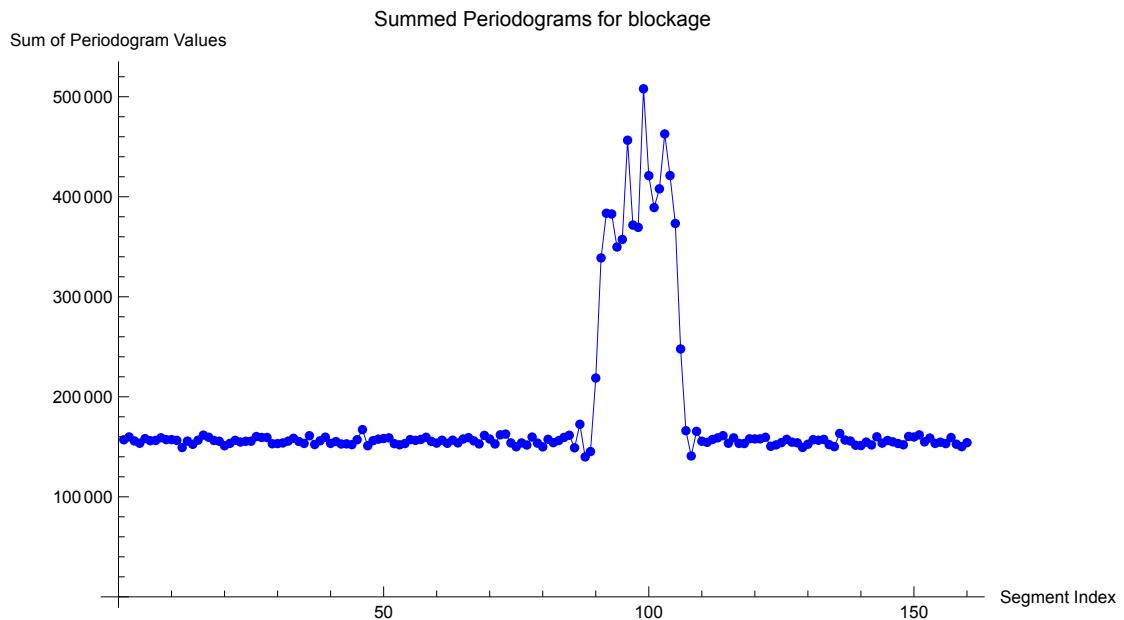
Out[=]= {156999., 159843., 155849., 153551., 158178., 156125., 156326., 159035.,
157153., 157208., 156418., 149249., 155707., 152467., 156637., 161624.,
159546., 156356., 155529., 151034., 153419., 156424., 154742., 155509.,
155609., 160251., 159306., 159335., 153034., 153201., 153846., 155668.,
158504., 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

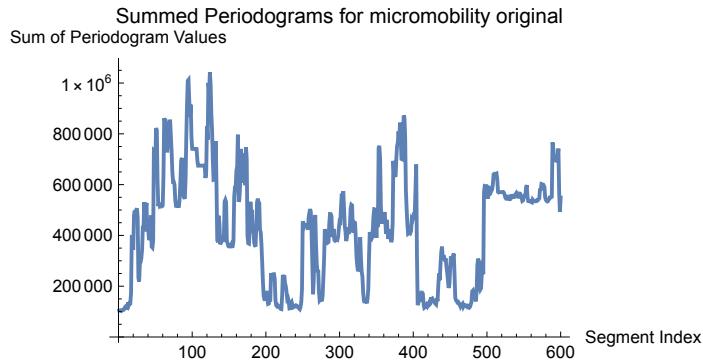
Out[=]= {104118., 104793., 105002., 102538., 104693., 105761., 106784., 113200.,
118236., 120805., 113786., 113507., 136825., 125588., 132454., 132571.,
171555., 390894., 389298., 344416., 479410., 497682., 470591., 500541.,
506259., 472131., 232184., 218446., 289618., 295028., 310517., 343935.,
432796., 435754., 530704., 416278., 498613., 528195., 417578., 463888.,
395327., 381696., 405311., 478132., 355714., 352308., 377491., 733802.,
730987., 694266., 822745., 813882., 612405., 515472., 528101., 515221.,
517582., 513831., 514412., 517687., 631622., 861525., 851251., 851460.,
840394., 727218., 757079., 762148., 762125., 855646., 795382., 734549.,
654546., 610798., 611142., 599480., 540992., 516011., 515478., 515313.,
515127., 515456., 546603., 611527., 694193., 705390., 611168.,
557980., 550081., 544235., 622916., 787004., 918392.,  $1.00884 \times 10^6$ ,
 $1.01257 \times 10^6$ , 933812., 867888., 914836., 788502., 740885., 740498.,
740588., 740065., 741105., 740703., 740303., 695486., 674595., 674498.,
675004., 674580., 675057., 674704., 674781., 675015., 674753.,
674646., 626187., 646027., 828888., 776736.,  $1.000053 \times 10^6$ , 963844.,
 $1.04238 \times 10^6$ , 994993., 876839., 811810., 695686., 619379., 620567.,
629240., 770830., 595604., 381303., 373126., 477484., 445124., 364852.,
370780., 397164., 381521., 375175., 390354., 532687., 539971., 530811.,
376962., 369988., 357983., 356408., 356886., 357667., 363776., 356881.,
357510., 379108., 551895., 588190., 588471., 654814., 670843., 796597.,
532745., 541839., 598244., 740579., 715760., 715486., 692822., 606719.,
669553., 597633., 746853., 702035., 400992., 369189., 367645., 425314.,
532359., 487616., 500635., 412809., 426830., 374155., 360501., 356033.,
441621., 530379., 544776., 531803., 527132., 422255., 412234., 363567.,
292369., 216116., 160499., 149066., 149476., 156402., 181585., 148659.,
130181., 131411., 146434., 146558., 250839., 225203., 234007., 246969.,
```

247260., 228232., 145676., 124571., 121223., 124908., 120757., 119517.,  
 114639., 110776., 109835., 157852., 244426., 231218., 243234., 211142.,  
 200205., 177829., 148479., 152231., 137225., 112522., 113334., 132935.,  
 137545., 125573., 116582., 118134., 120792., 120847., 124561., 123011.,  
 118499., 116517., 111989., 109189., 117312., 137355., 186643., 455215.,  
 445925., 436080., 442068., 440562., 439325., 431850., 422654., 469508.,  
 488934., 503692., 491880., 412957., 288493., 168342., 228750., 424536.,  
 480570., 366205., 287605., 255789., 264390., 179487., 143829., 147353.,  
 147121., 140870., 163550., 232148., 307731., 425186., 378606., 371305.,  
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 426975., 454322., 452441., 515297., 564210., 517213., 574341., 509680.,  
 437815., 415243., 377909., 392224., 432152., 412365., 412286., 436019.,  
 505375., 520660., 518200., 421624., 411174., 451183., 449494., 390379.,  
 313657., 281058., 258965., 265880., 310199., 392230., 311323., 256880.,  
 238346., 175810., 144516., 134674., 147939., 139492., 133014., 151959.,  
 191047., 319887., 413229., 386653., 384378., 390664., 418324., 473943.,  
 503068., 502264., 480776., 390057., 505013., 432606., 744924., 752668.,  
 702473., 524802., 446112., 470678., 468498., 466310., 491982., 460601.,  
 407019., 461162., 422668., 386509., 394983., 408401., 423719., 373529.,  
 381728., 447221., 693537., 636050., 635861., 631099., 701176., 751396.,  
 764307., 809059., 767815., 843974., 782753., 701096., 699720., 742802.,  
 872265., 864254., 788198., 576758., 505388., 444273., 406153., 408204.,  
 411839., 409109., 417243., 464067., 459576., 468195., 489646., 482006.,  
 579812., 679146., 322357., 125583., 135427., 144146., 145058., 146088.,  
 174861., 174859., 170857., 129563., 114854., 117007., 121308., 126860.,  
 121897., 129888., 134044., 127241., 130399., 156303., 147408., 150358.,  
 144868., 138207., 136036., 131422., 128433., 153142., 141101., 205167.,  
 249924., 223600., 288002., 334262., 355730., 314795., 312640., 313800.,  
 298487., 309558., 277411., 254498., 225449., 193231., 205415., 260697.,  
 317447., 308705., 307456., 319058., 328675., 246634., 154993., 144898.,  
 140597., 136101., 137901., 132812., 126563., 120133., 127329., 128964.,  
 131759., 119855., 125483., 125101., 122263., 123977., 124165., 116918.,  
 117582., 115564., 118919., 128337., 137915., 179790., 183084., 171061.,  
 170190., 154521., 140227., 180220., 284039., 308587., 298921., 199672.,  
 186797., 191998., 245493., 299598., 247376., 571485., 594346., 593335.,  
 593819., 578636., 544988., 556069., 560394., 584516., 581707., 574995.,  
 581546., 600453., 640014., 642754., 642219., 642488., 643799., 620639.,  
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 567855., 559994., 548437., 544457., 544215., 544883., 558875., 544216.,  
 542599., 543439., 555482., 555960., 550899., 550684., 551105., 557953.,  
 562480., 549331., 559025., 552433., 552223., 564758., 564299., 557412.,  
 549913., 535740., 537752., 553379., 557169., 548165., 585921., 598091.,  
 551837., 535287., 534975., 535163., 534463., 530997., 529706., 541119.,  
 537316., 534333., 534607., 534439., 534963., 538782., 538345., 541888.,  
 545915., 584632., 577808., 602549., 601530., 595664., 596647., 590165.,  
 549585., 539505., 535167., 533464., 535297., 541306., 549217., 548914.,

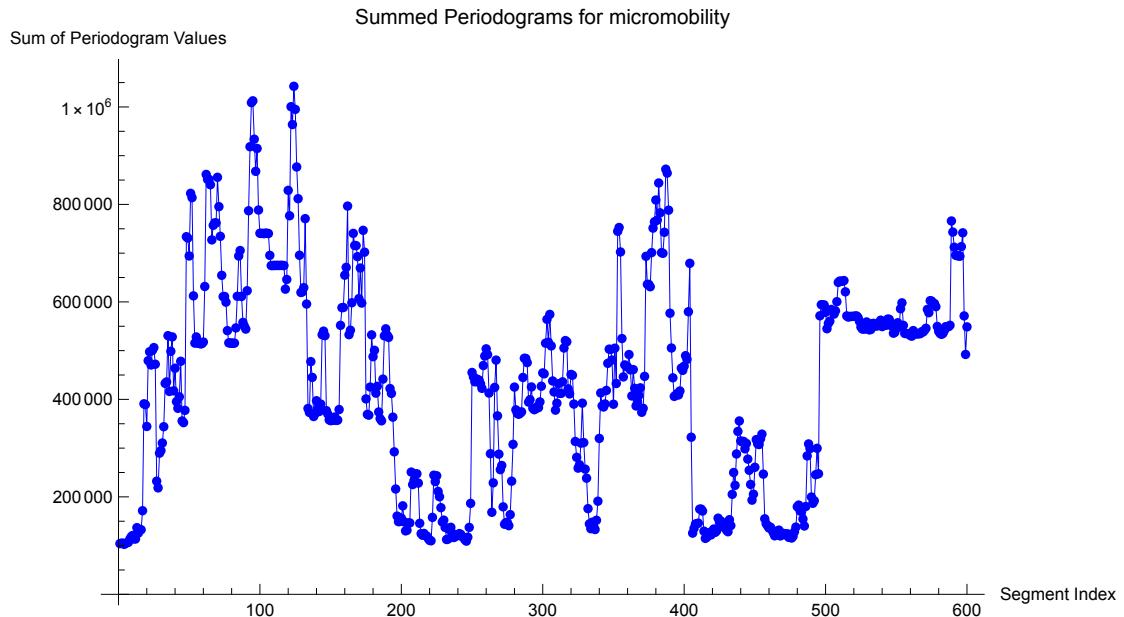
```
549 233., 552 012., 766 040., 743 224., 712 198., 695 773., 694 760.,
694 648., 693 706., 713 381., 741 735., 571 249., 492 188., 548 806.]}
```

```
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[=]=

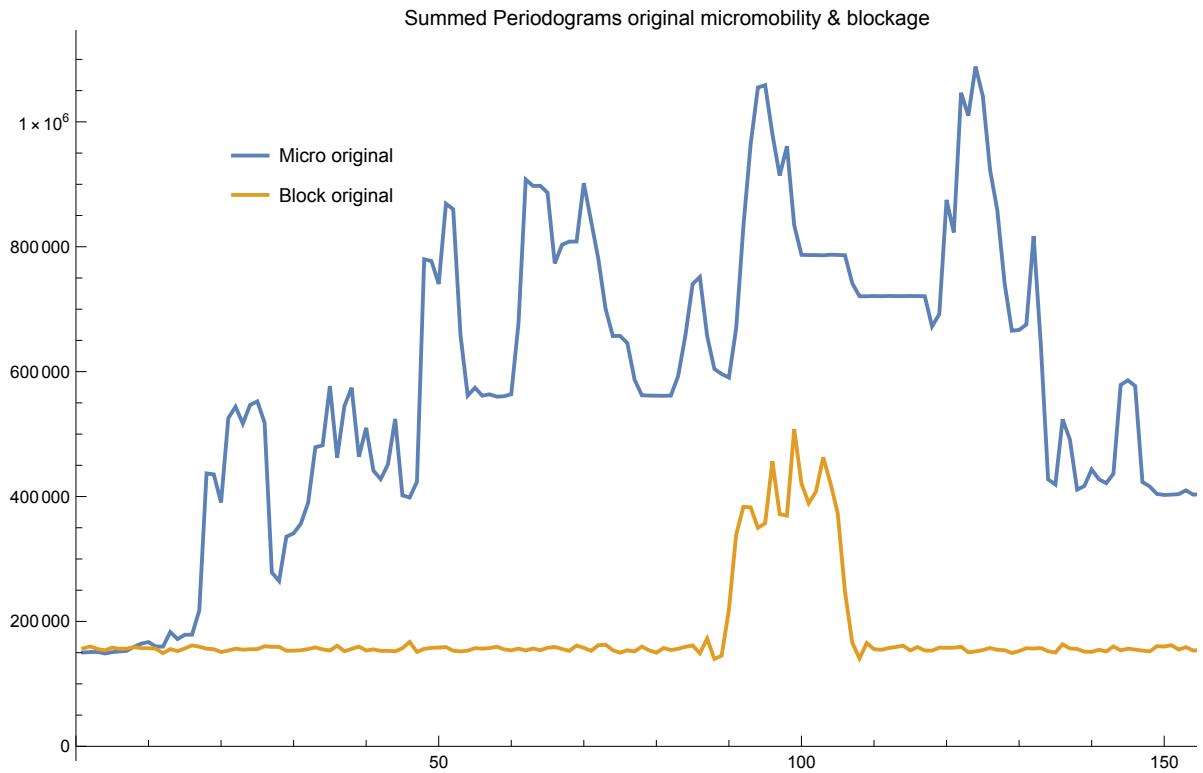


Out[=]=



```
In[]:= ListLinePlot[{sumPeriodograms1 + 46152, sumPeriodograms},  
PlotRange → {{0, 163}, All}, PlotStyle → {BlueGray},  
PlotLabel → "Summed Periodograms original micromobility & blockage",  
PlotLegends → Placed[{"Micro original", "Block original"}, {0.2, 0.8}]]
```

Out[]=



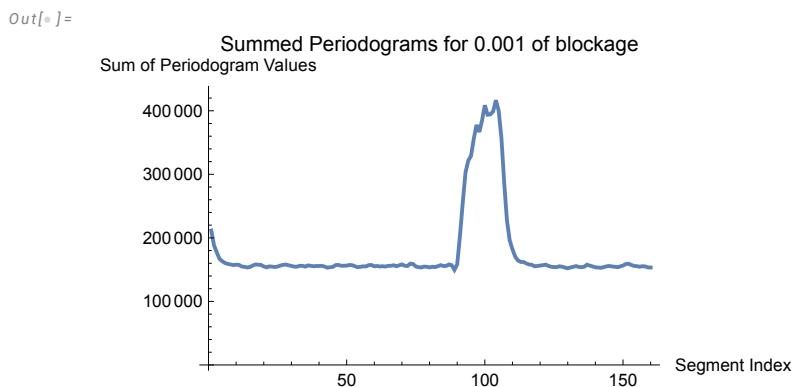
```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for blockage*)
sumPeriodograms2 = {};

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

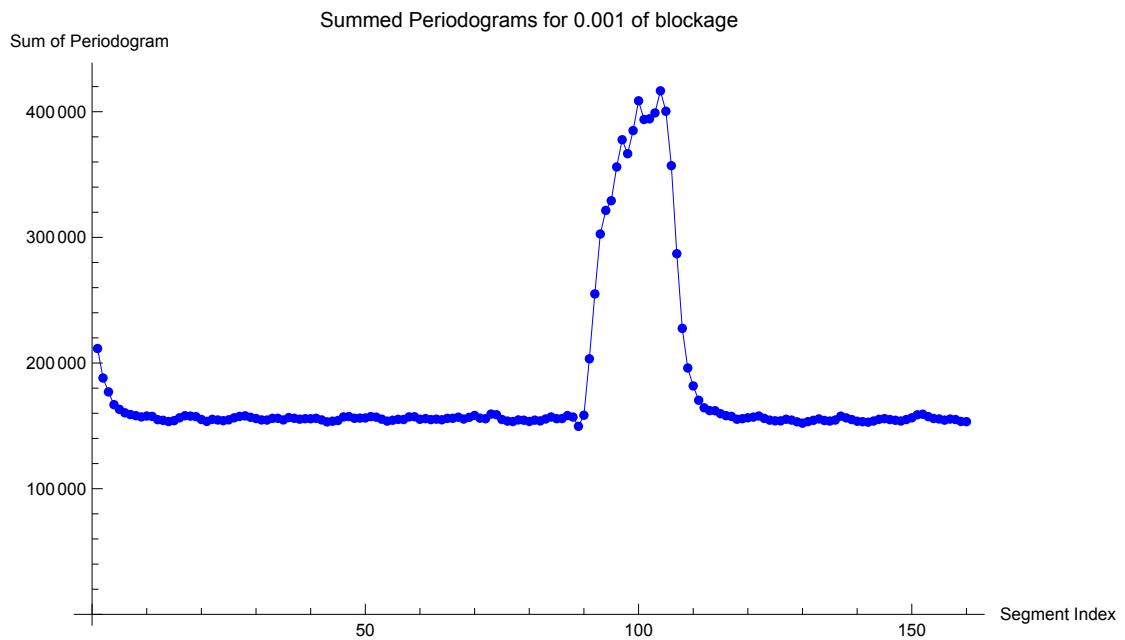
(*Loop through each segment*)
For[i = 1, i ≤ numSegments2, i++,
(*Extract the i^th segment of 500 values*)
blockSegment2 = Take[movingAvg1, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram2 = PeriodogramArray[blockSegment2];
(*Sum up the values of the periodogram*)
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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158057., 157778., 157350., 155078., 153549., 155176., 154684., 154122.,
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[ $\circ$ ] =



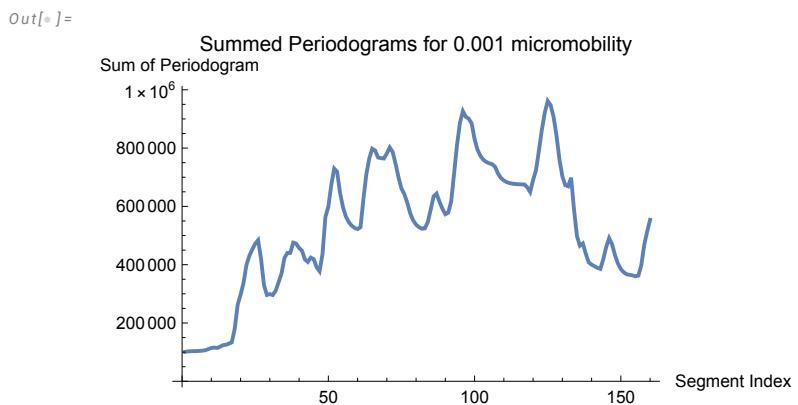
```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.001 decay rate for micromobility*)
sumPeriodograms3 = {};

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

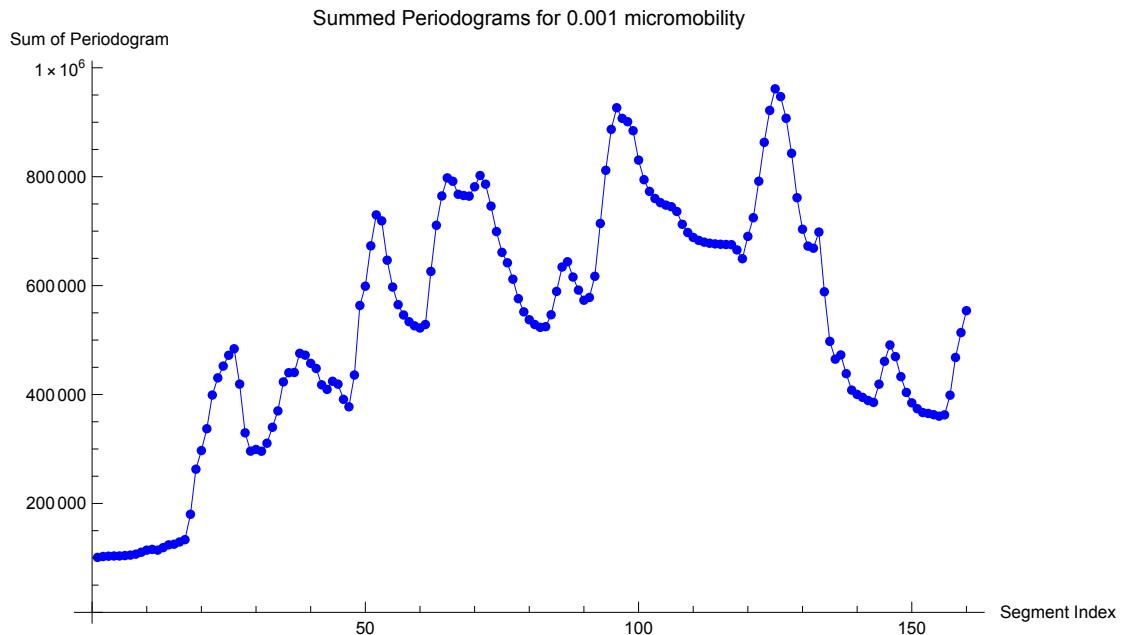
(*Loop through each segment*)
For[i = 1, i ≤ numSegments2, i++,
(*Extract the i^th segment of 500 values*)
blockSegment3 = Take[movingAvg3, {500 * (i - 1) + 1, 500 * i}];
(*Compute the periodogram for the current segment*)
periodogram3 = PeriodogramArray[blockSegment3];
(*Sum up the values of the periodogram*)
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[=] = {100 940., 102 563., 103 146., 103 539., 103 589., 104 270., 105 099., 106 847.,
110 365., 114 249., 115 622., 114 299., 118 892., 123 943., 125 116., 129 239.,
133 524., 180 102., 262 844., 297 115., 337 195., 399 044., 430 589., 452 250.,
472 152., 484 059., 419 178., 329 665., 296 065., 299 120., 295 895., 310 580.,
339 878., 369 940., 423 208., 440 110., 440 502., 475 666., 472 279., 457 299.,
447 941., 417 885., 409 388., 424 305., 419 073., 391 138., 377 502., 435 819.,
563 572., 598 964., 673 069., 729 867., 718 925., 646 684., 597 400., 565 043.,
546 022., 533 748., 526 182., 522 200., 528 629., 626 056., 710 799., 764 660.,
797 834., 791 646., 767 695., 765 446., 764 265., 781 516., 802 187., 786 279.,
746 003., 699 277., 661 073., 641 882., 611 787., 576 037., 551 829., 537 359.,
528 593., 523 319., 524 646., 546 472., 589 360., 634 122., 643 817., 615 768.,
591 808., 573 120., 578 188., 617 167., 714 118., 811 710., 886 927., 926 657.,
907 140., 900 979., 884 456., 830 504., 794 525., 773 091., 760 040., 752 333.,
747 813., 744 873., 736 143., 712 631., 697 494., 688 501., 683 107., 679 848.,
677 818., 676 661., 675 926., 675 477., 675 249., 665 584., 649 429., 690 418.,
724 650., 791 701., 863 065., 921 718., 961 387., 947 073., 907 300., 842 913.,
761 438., 703 548., 672 550., 668 670., 698 342., 588 721., 497 629., 464 927.,
472 707., 438 346., 408 102., 400 137., 394 768., 389 015., 385 482., 418 948.,
460 971., 490 973., 469 636., 432 822., 403 894., 384 741., 374 000., 366 905.,
365 226., 362 983., 360 249., 362 679., 398 791., 468 063., 513 782., 553 966.}
```

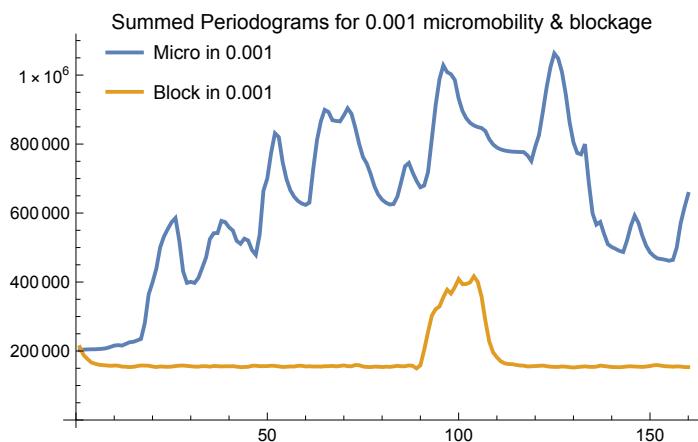


Out[•]=



```
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, 0.9}]]
```

Out[•]=



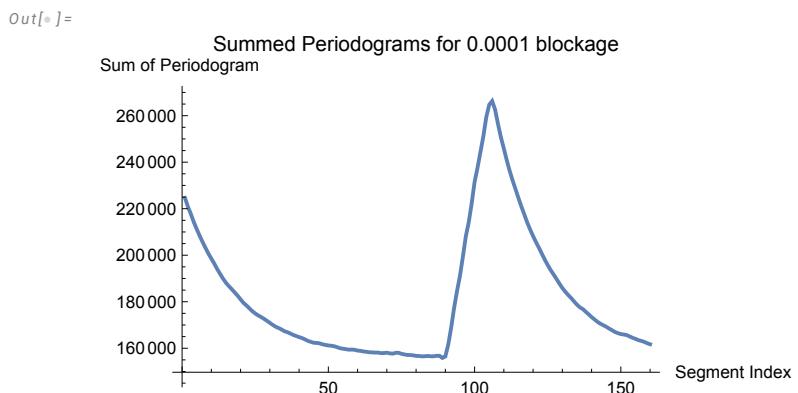
```
In[4]:= (*Initialize the list to store the sum of
periodograms with 0.0001 decay rate for blockage*)
sumPeriodograms4 = {};

(*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[ ] =*

Summed Periodograms for 0.0001 blockage

Sum of Periodogram

260 000  
240 000  
220 000  
200 000  
180 000  
160 000

50 100 150 Segment Index

```

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[ ] =*

{100 346., 100 574., 100 742., 100 911., 101 040., 101 245., 101 491., 101 865.,
102 520., 103 354., 104 048., 104 440., 105 411., 106 659., 107 591., 108 887.,

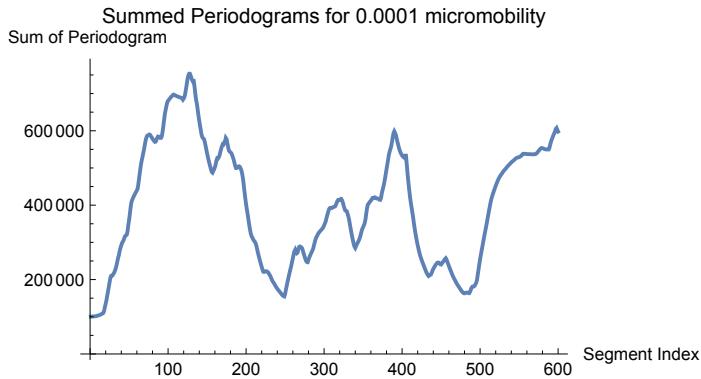
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 691155., 700275., 712885., 726283., 739713., 748469., 753267., 753238.,  
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 511985., 503942., 496133., 489307., 487343., 491908., 496417., 501948.,  
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 222196., 222444., 221360., 220035., 216790., 213268., 209819., 204898.,  
 199795., 195423., 192499., 189141., 185437., 181788., 178443., 175372.,  
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 259201., 264340., 269091., 273631., 278154., 283417., 291704., 300035.,  
 307804., 313589., 316862., 321745., 325315., 327862., 330288., 332846.,  
 335185., 337648., 340815., 345691., 350629., 355677., 364660., 372496.,  
 379773., 387450., 391457., 392762., 393054., 392301., 393609., 394935.,  
 395589., 396583., 400323., 405625., 410918., 413843., 413570., 414500.,  
 416223., 416843., 413158., 407122., 399266., 392105., 386125., 384622.,  
 383834., 377699., 370721., 361680., 349832., 337257., 325658., 315211.,  
 304743., 295033., 288550., 285011., 289768., 294851., 298839., 302872.,  
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 361053., 376670., 391102., 400961., 404315., 406935., 409856., 412491.,  
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 417795., 416652., 414583., 414272., 419769., 431761., 440855., 449300.,  
 458676., 470355., 483319., 496117., 508746., 521400., 534710., 543790.,  
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```

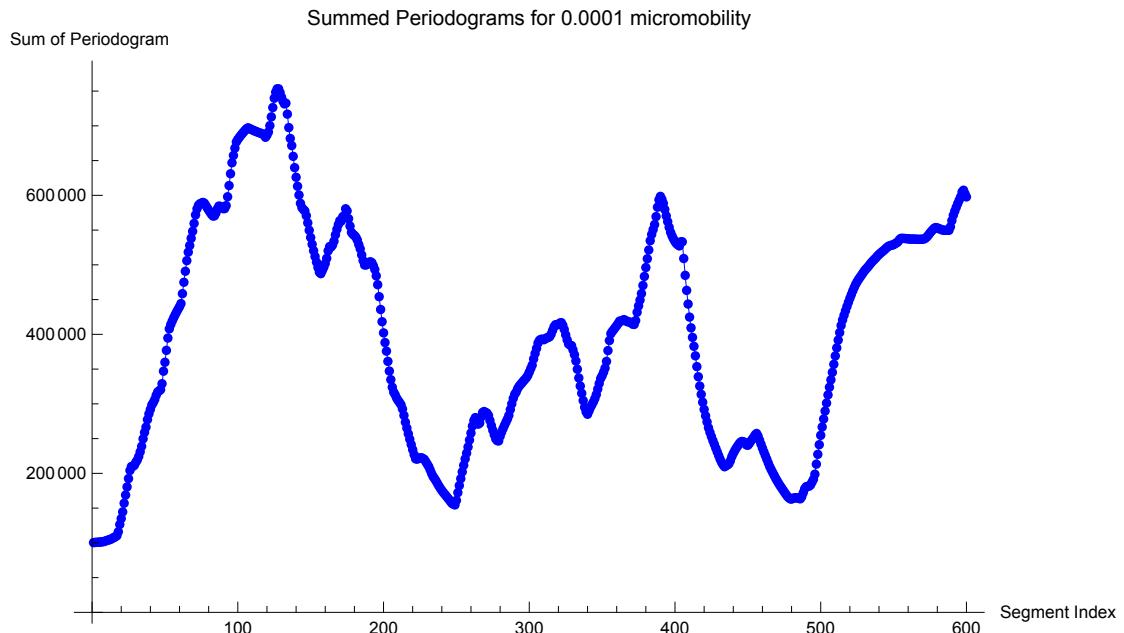
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530 644., 528 796., 527 238., 533 166., 533 123., 509 109., 484 877., 463 233.,
443 561., 424 817., 409 363., 395 640., 382 756., 369 099., 353 587., 338 999.,
325 610., 313 628., 302 327., 292 006., 282 713., 274 004., 265 505., 258 903.,
252 915., 247 192., 241 804., 236 260., 230 795., 225 457., 220 149., 215 745.,
212 237., 209 513., 210 992., 212 124., 213 875., 218 159., 224 026., 228 775.,
232 586., 236 234., 239 327., 242 474., 244 871., 245 883., 245 481., 244 046.,
240 987., 240 402., 243 007., 246 195., 249 056., 251 835., 255 310., 257 354.,
253 581., 247 844., 242 077., 236 303., 230 866., 225 609., 220 356., 214 916.,
209 827., 205 397., 201 404., 197 323., 193 217., 189 571., 186 046., 182 590.,
179 595., 176 386., 173 215., 170 180., 167 352., 165 081., 163 371., 162 973.,
164 102., 164 715., 164 938., 164 978., 163 868., 163 378., 166 408., 172 109.,
177 819., 180 750., 181 371., 181 535., 183 217., 187 273., 191 383., 198 775.,
213 242., 227 361., 241 216., 254 722., 266 658., 278 151., 289 624., 301 094.,
312 853., 323 881., 334 553., 345 317., 356 917., 368 945., 380 518., 391 715.,
402 530., 412 758., 420 724., 427 408., 433 872., 440 090., 446 049., 451 748.,
457 225., 462 499., 467 437., 472 021., 475 792., 479 129., 482 203., 485 154.,
488 318., 491 356., 493 782., 496 097., 498 601., 501 467., 503 860., 506 102.,
508 233., 510 370., 512 886., 514 898., 516 826., 518 633., 520 234., 522 080.,
524 102., 525 936., 527 257., 527 976., 528 378., 529 009., 530 539., 531 583.,
533 104., 536 139., 538 127., 538 134., 537 996., 537 844., 537 707., 537 475.,
537 099., 537 020., 537 161., 537 059., 536 947., 536 812., 536 713., 536 703.,
536 807., 536 973., 537 314., 538 602., 540 563., 543 045., 545 894., 548 388.,
550 653., 552 856., 553 635., 553 056., 552 321., 551 382., 550 600., 549 892.,
549 736., 549 705., 549 674., 549 692., 554 736., 563 675., 571 437., 577 309.,
582 813., 588 037., 593 016., 597 773., 604 828., 607 374., 602 299., 597 745.}

```

Out[1]=



Out[•] =



```
In[•]:= ListLinePlot[{sumPeriodograms5 + 124 249, sumPeriodograms4},
  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[•] =

