

```
(Local) In[4]:=
<< UnitaryGroup`
```

```
(Local) In[6]:=
Names["UnitaryGroup`*"]
```

```
(Local) Out[6]=
{AbeliansNumber, Domains, GeneratesGroup, Generating, GeneratorRow, Ideal, Ideals, InnerProduct,
InnerProductGroup, isHomoMorphism, IsIdeal, NonGenerating, OuterProduct, OuterProductGroup,
Principallideal, Relabel, Spanning, TotalSpan, TuplingsNumber, UnitaryGroupPackage, UnitPairs, Units,
UnitsGroupTable, UnitsMakeGroup, UnitsSubgroup, ZeroDivisorPairs, ZeroDivisors, ZeroDivisorTable}
```

Numbers of Abelian groups of order n

Script for finding, for each integer, the number of Abelian groups of that order, considering only orders larger than 81. These Abelian-frequencies are peculiarly distributed along the integers if I am not greatly misstating me.

```
(Local) In[7]:=
found = <| >;
Module[{i = 6000, j = 1, k = 0},
While[True,
a = AbeliansNumber[i];
If[a > 81,
AppendTo[found, i -> a];
If[Mod[j, 28] == 0, Print[Values[found[[k * 28 + j + 1 ;; k * 28 + j + 28]]]];
k ++, None];
j = Mod[j + 1, 28];
,
None];
i ++;
];];
```

```
{90, 99, 90, 90, 100, 90, 99, 90, 99, 110, 90, 90, 90, 135, 90, 135, 90, 125, 99, 90, 90, 99, 100, 110, 110, 135, 90, 90}
{162, 99, 90, 105, 99, 105, 90, 90, 90, 90, 110, 135, 99, 90, 110, 100, 125, 100, 121, 90, 99, 135, 90, 90, 99, 90, 90, 135}
{90, 90, 110, 90, 99, 150, 99, 108, 105, 90, 105, 90, 162, 100, 126, 99, 99, 125, 90, 110, 90, 100, 165, 99, 110, 90, 90, 105}
{90, 90, 120, 90, 88, 90, 90, 110, 135, 99, 90, 180, 110, 110, 125, 90, 90, 99, 100, 90, 225, 90, 90, 121, 90, 135, 126, 110}
{108, 99, 105, 110, 135, 100, 84, 90, 135, 90, 135, 90, 90, 90, 105, 100, 90, 90, 90, 105, 99, 135, 90, 125, 150, 90, 99, 110}
{135, 90, 84, 90, 99, 100, 90, 165, 90, 105, 90, 90, 100, 90, 90, 135, 126, 120, 99, 198, 90, 90, 99, 100, 90, 90, 90, 90}
{99, 125, 108, 90, 100, 90, 110, 121, 90, 90, 110, 110, 165, 135, 108, 110, 90, 115, 90, 135, 135, 99, 120, 99, 100, 110, 90, 90}
{90, 90, 100, 88, 162, 125, 110, 90, 150, 99, 243, 90, 90, 117, 110, 99, 90, 110, 90, 90, 90, 90, 150, 125, 90, 90, 99, 100}
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{105, 90, 90, 198, 99, 90, 105, 198, 125, 90, 100, 90, 90, 90, 135, 99, 100, 90, 100, 90, 99, 90, 135, 90, 225, 88, 90, 90}
{90, 100, 110, 90, 84, 90, 99, 90, 90, 100, 90, 90, 150, 121, 110, 135, 110, 135, 90, 105, 108, 99, 100, 110, 225, 90, 90, 99}
{84, 90, 198, 110, 125, 162, 85, 90, 105, 100, 90, 90, 105, 99, 90, 110, 100, 90, 105, 100, 100, 110, 99, 99, 135, 126, 110, 90}
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(Local) In[131]:=

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ma10 = MovingAverage [Values [found], 10]; ma20 = MovingAverage [Values [found], 20];
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titlelbl = ToString [First [Keys [found[1 ;; 1]]] ] <> " to " <> ToString [First [Keys [found[-1 ;; -1]]] ];

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ListPlot [found, PlotLabel → "All found frequencies"]

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ListPlot [ma10, PlotLabel → "Moving average of 10 from " <> titlelbl]

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ListPlot [ma20, PlotLabel → "Moving average of 20 from " <> titlelbl]

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ListPlot [ma50, PlotLabel → "Moving average of 50 from " <> titlelbl]

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ListPlot [ma100, PlotLabel → "Moving average of 100 from " <> titlelbl]

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ListPlot [ma200, PlotLabel → "Moving average of 200 from " <> titlelbl]

```

```

ListPlot [ma400, PlotLabel → "Moving average of 400 from " <> titlelbl]

```

```

ListPlot [ma1000, PlotLabel → "Moving average of 1000 from " <> titlelbl]

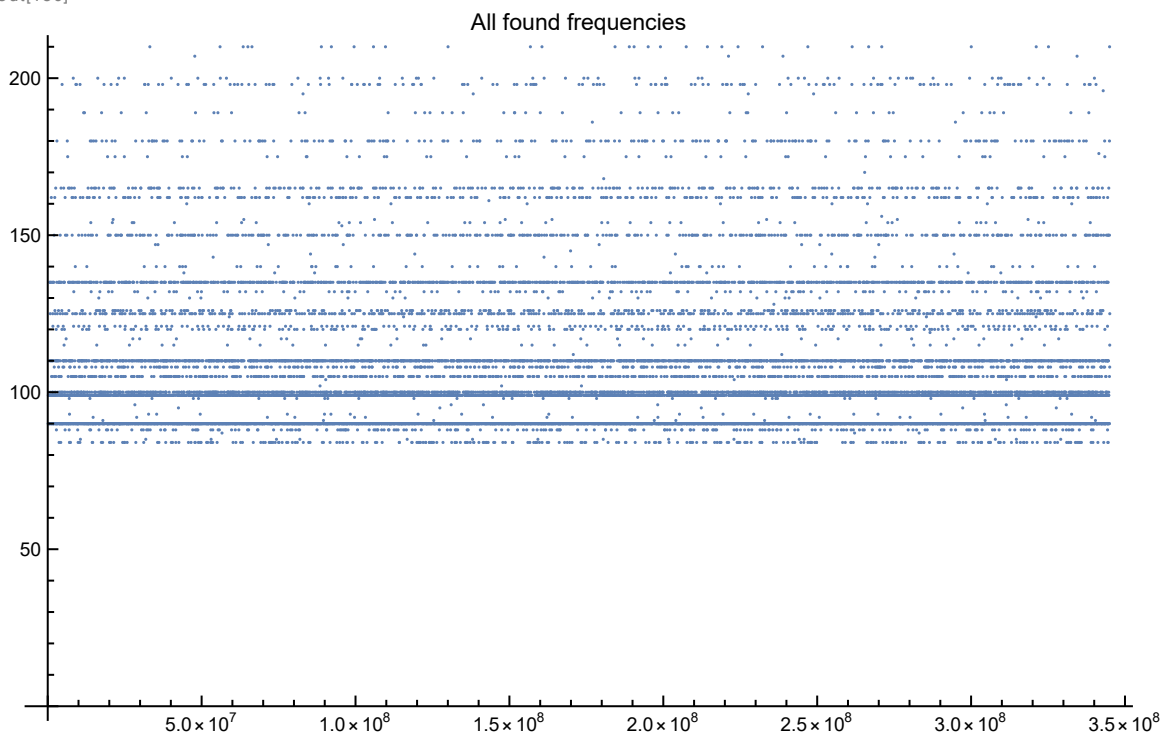
```

```

ListPlot [ma2000, PlotLabel → "Moving average of 2000 from " <> titlelbl]

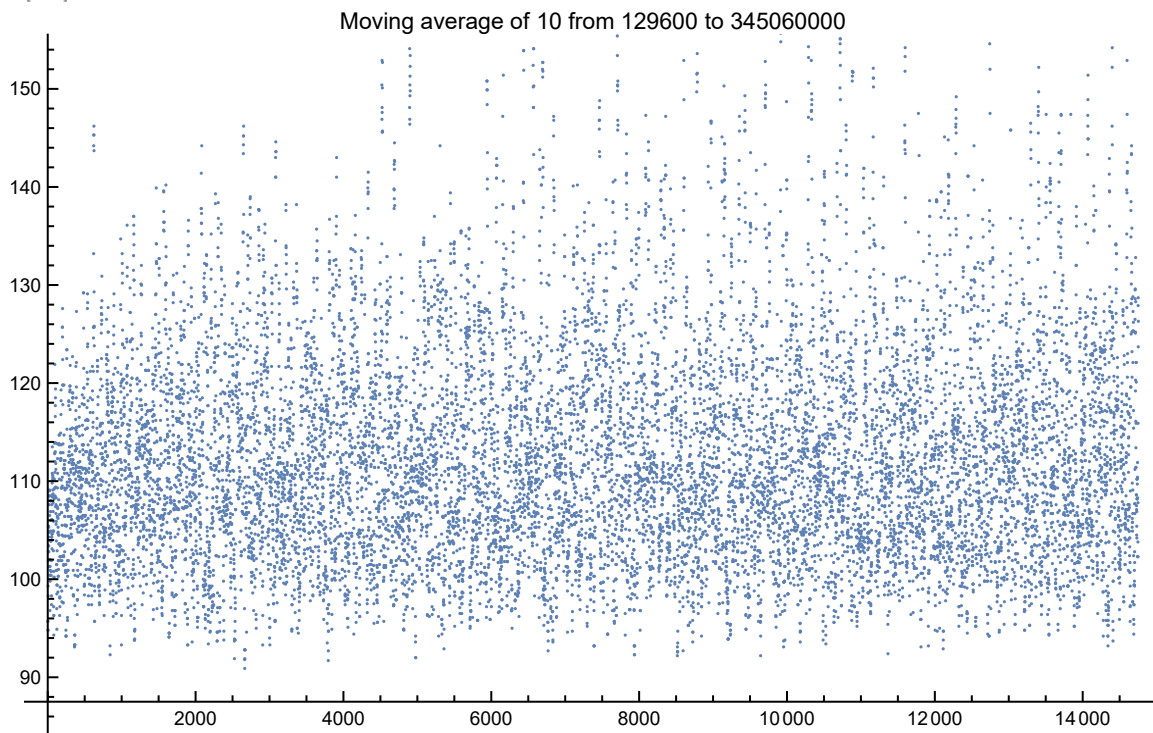
```

(Local) Out[136]=

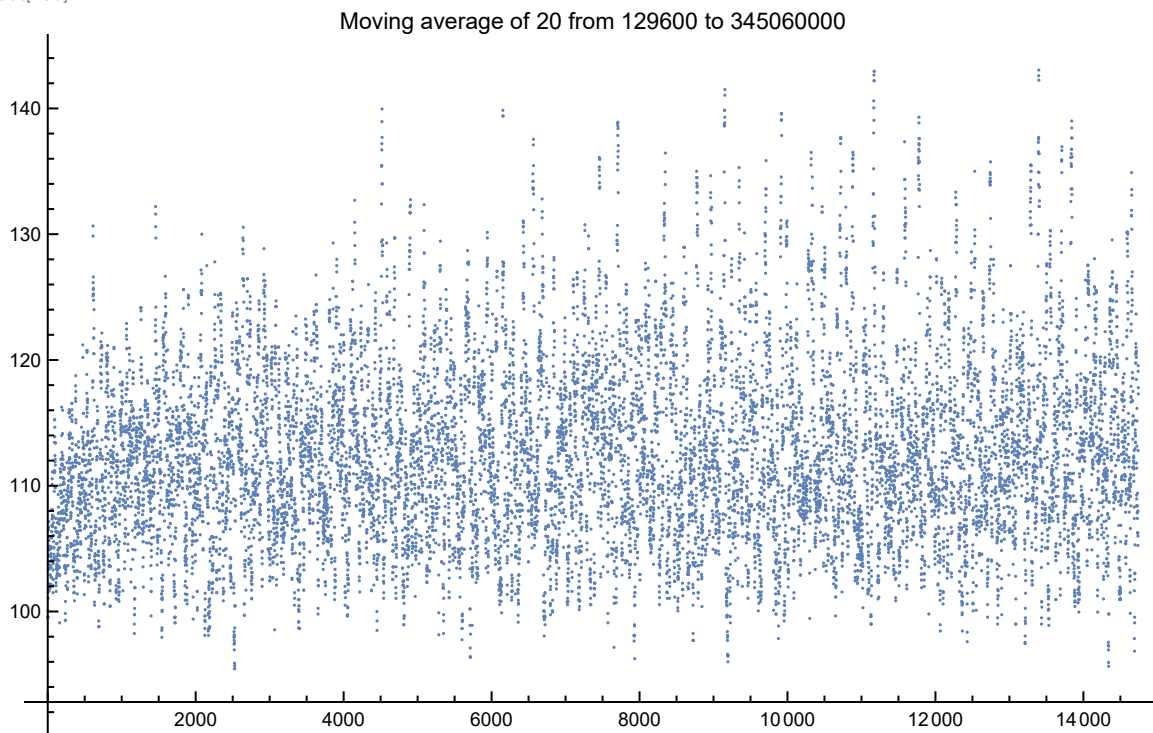




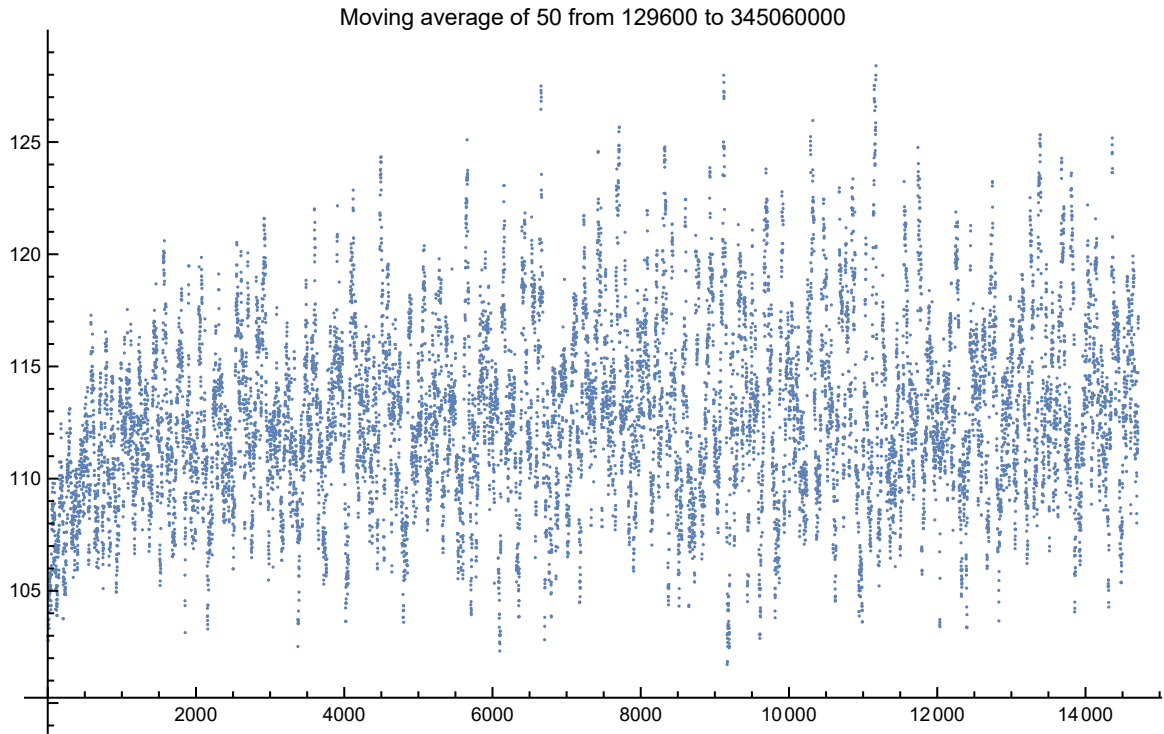
(Local) Out[137]=



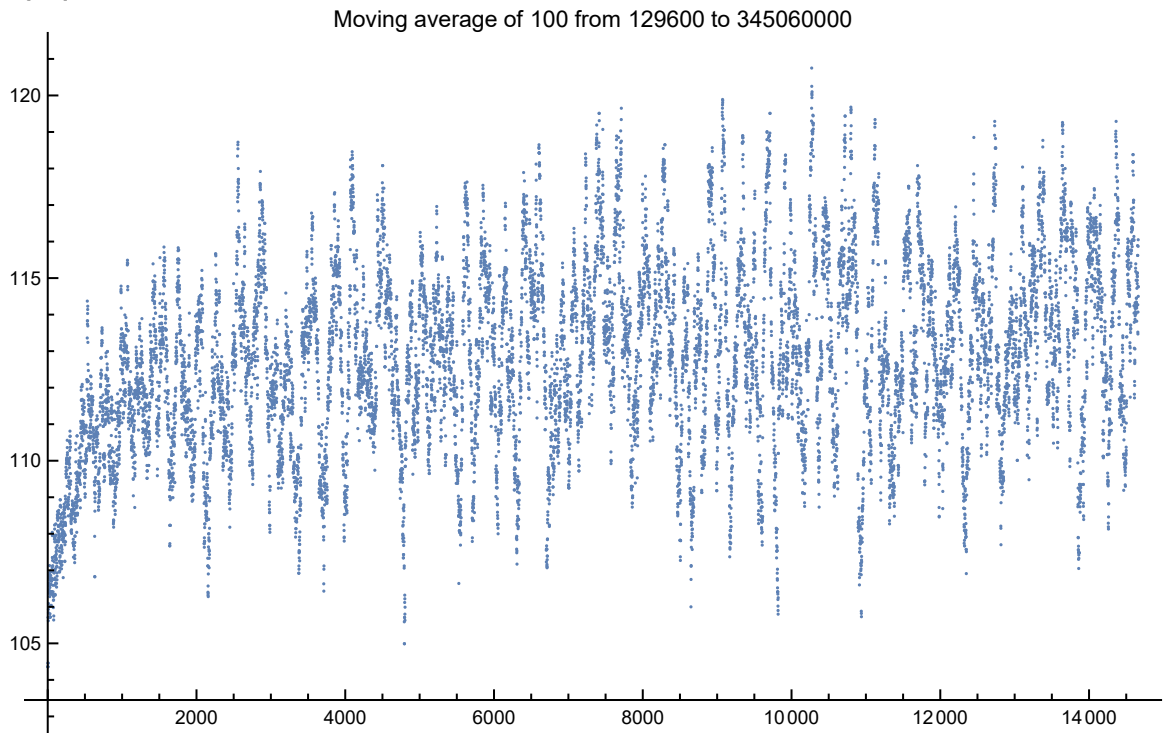
(Local) Out[138]=



(Local) Out[139]=

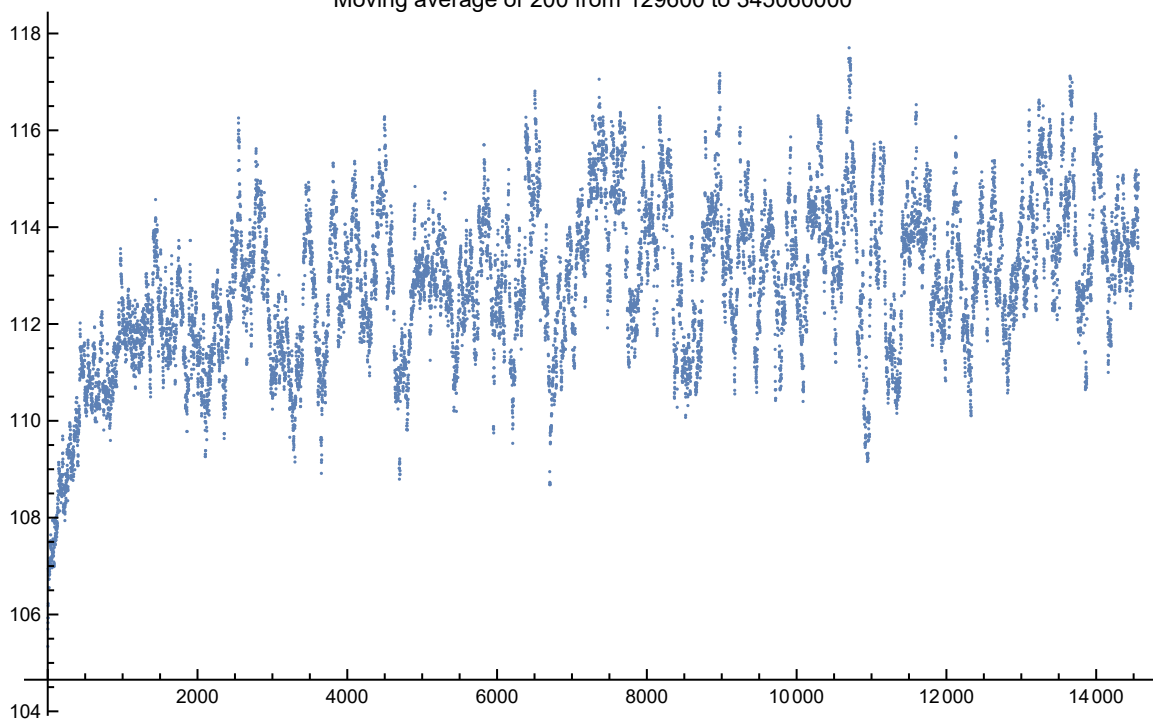


(Local) Out[140]=



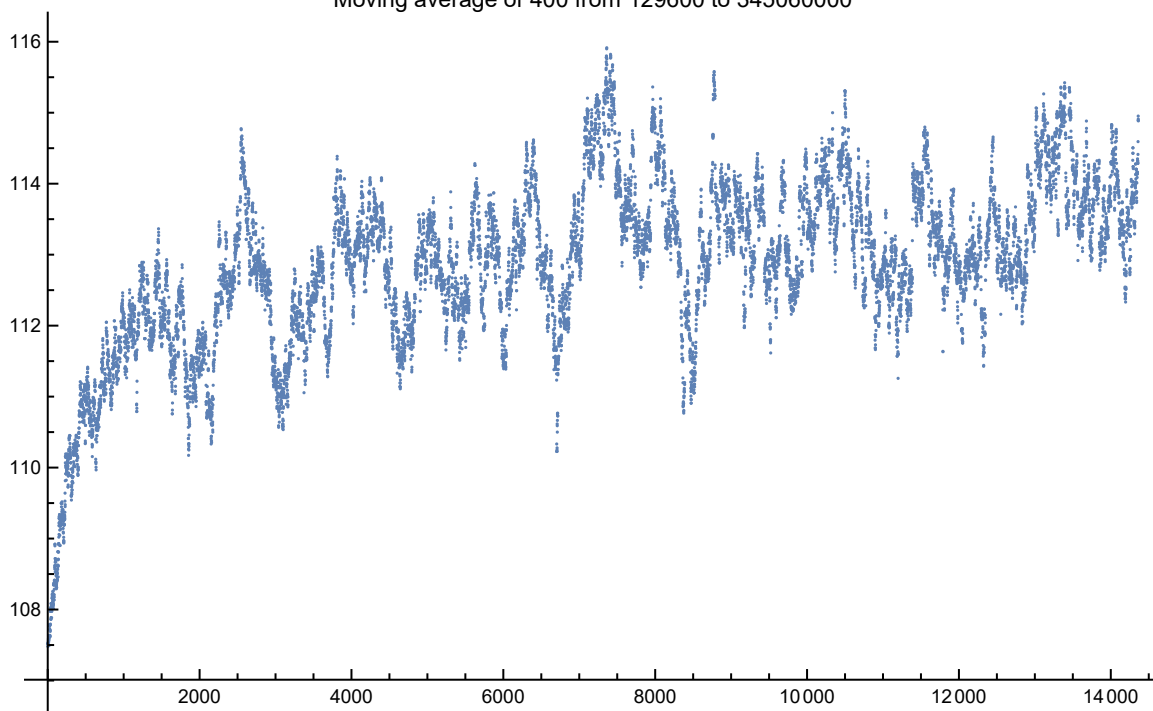
(Local) Out[141]=

Moving average of 200 from 129600 to 345060000



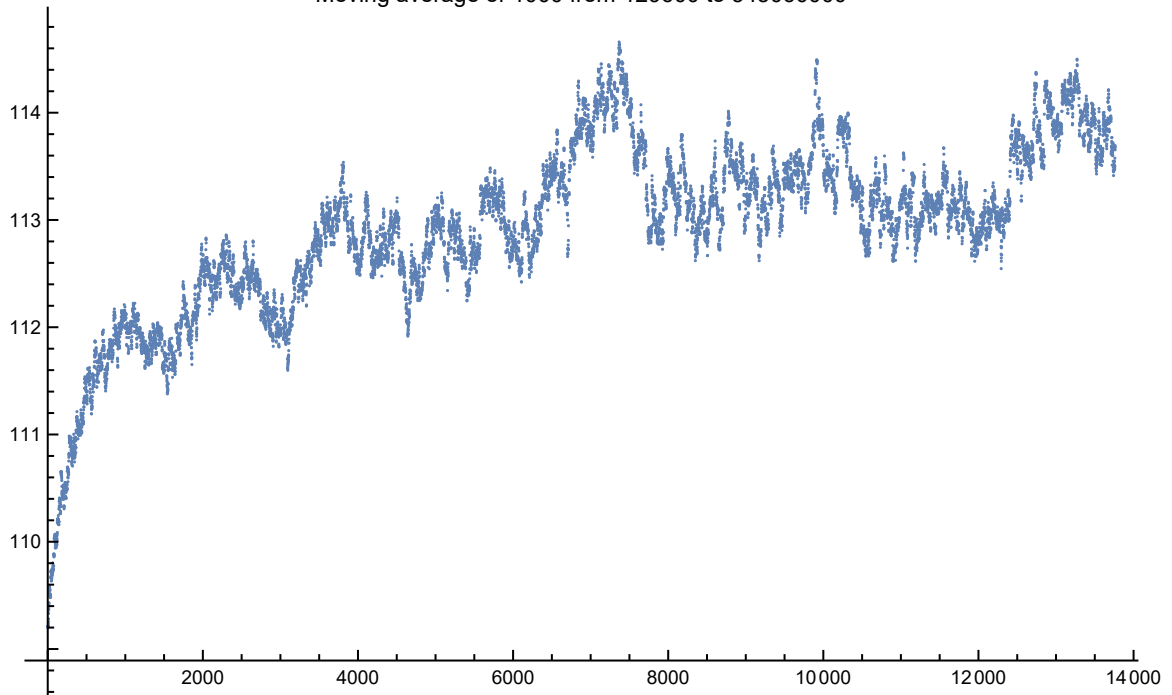
(Local) Out[142]=

Moving average of 400 from 129600 to 345060000



(Local) Out[143]=

Moving average of 1000 from 129600 to 345060000



(Local) Out[144]=

Moving average of 2000 from 129600 to 345060000

