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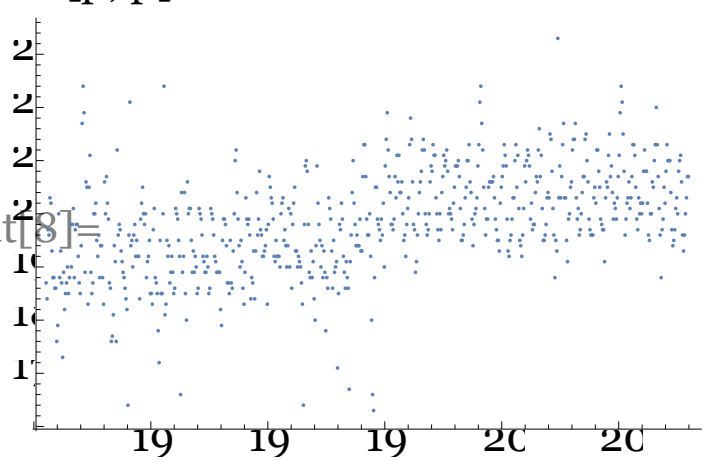
Kouma-Kondo, Togo Monthly Minimum data

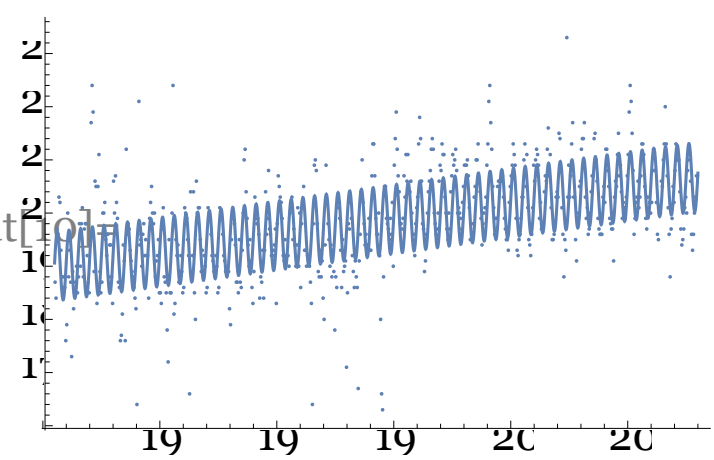
In[1]:=

```
KoumaKondo = Partition
    Flatten[Import[\\MAT\\MinProject\\Min_Temps_Kouma.xls]], 4];
MinYears = KoumaKondo[2, Length[KoumaKondo, 2]];
MinTemps = KoumaKondo[2, Length[KoumaKondo, 2]];
MinData = Table[MinYears, MinTemps, {i, Length[MinYears]}];
m = LinearModelFit[MinData, {x, Sin[2*Pi*x], Cos[2*Pi*x]}, x]
FittedMo[-41.32 + 0.0307 x - 5.6682 Sin[2 x] + 0.6441 Sin[4 x]]
(*I don't know why intercept at -41..*)
p1 = ListPlot[MinData]
p2 = Plot[m[x], {x, 1961, 2016}];
Show[p1, p2]
```

Out[8]=



Out[10]=



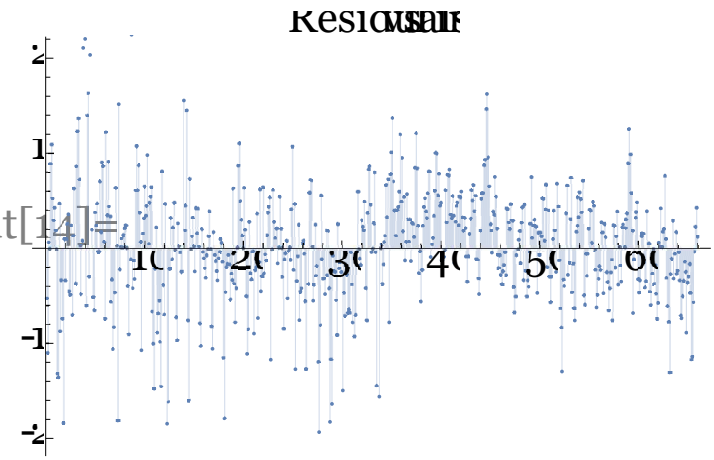
In[11]:=
```
In[RSquar
```
Out[11]=
```
0.468
```

In[12]:=
```
In[ParameterConfidence]
```
Out[12]=
```
{{-48.118, -34.522}, {0.027337, 0.034174}}
{{0.567782, 0.721299}, {-0.008486, 0.9450}}
```

In[13]:=
```
(*Sothelinearmodelsignificantallparameterexceptheinterm?*)
```

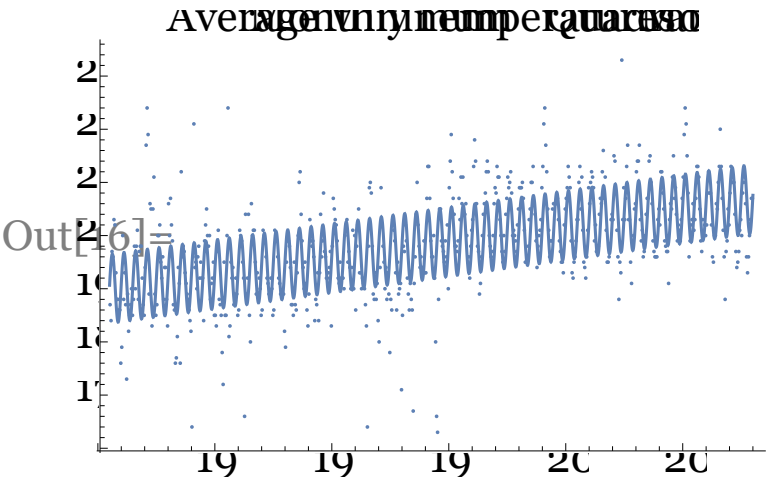
In[14]:=
```
ListPlotFitResidualsFillingAxis
PlotLabelHoldForesidualsTimeLabelStyleGrayLevel
```

Out[14]=



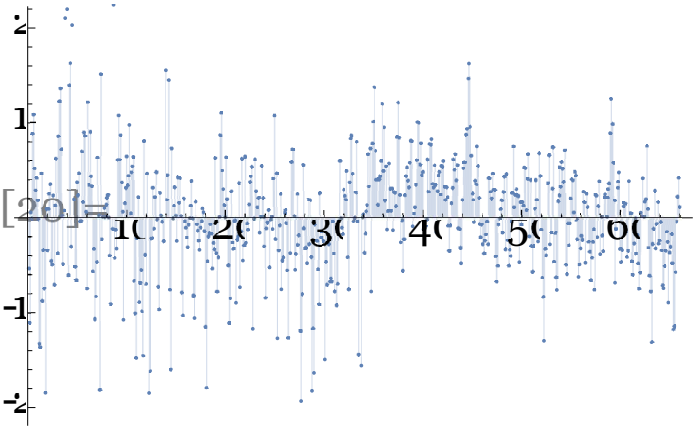
In[15]:=
```
qmLinearModelFitDataxx^2, Sin[2*Pi*x], Cos[2*Pi*x] }, x]
ShowListPlotMinDataPlotqmx, {x, 1961, 2016},
PlotLabelHoldForAverageMonthlyMinimumTemperaturesQuadraticMode
LabelStyleGrayLevel
```

Out[15]=
```
FittedMo
```
$5.7130 - 0.016x + 0.0682x^2 + 0.6484x$



In[16]:=
```
qmRSquar
```
Out[16]=
```
0.468
```

In[18]:=
```
qmParameterConfidence[]
```
Out[18]=
```
{{-946.7,958.16},{-0.974,0.941},{-0.000228,0.0025},{-0.0085,0.0144}}
```
In[19]:=
```
(So the quadratic is significant except for in the cos term)
```
In[20]:=
```
List Plot[FitResiduals, Filling Axis]
```
Out[20]=



In[21]:=
```
Show[%58, PlotLabel Hold[Residuals Time, LabelStyle GrayLevel]]
```
Show is not a type of graph.
Out[21]=
```
Show[%58, PlotLabel Residuals Time, LabelStyle]
```
In[22]:=

In[23]:=

Trying it again, removing anything below 17 or above 22 (I just picked those numbers to be the limit for the outliers because that seemed to make sense for the data)

```
Kouma-Konda Monthly Minimum data
```
In[24]:=
```
KoumaKondaMin2 = Partition[Flatten[Import[\\MAT5\Min-Project\Min_Temp.xlsx]], 4];
MinYears2 = KoumaKonda[2, Length[KoumaKonda[2]]];
MinTemps2 = KoumaKonda[2, Length[KoumaKonda[2]]];
MinDataTable[MinYears2, MinTemps2, {i, Length[MinYears2]}];
```

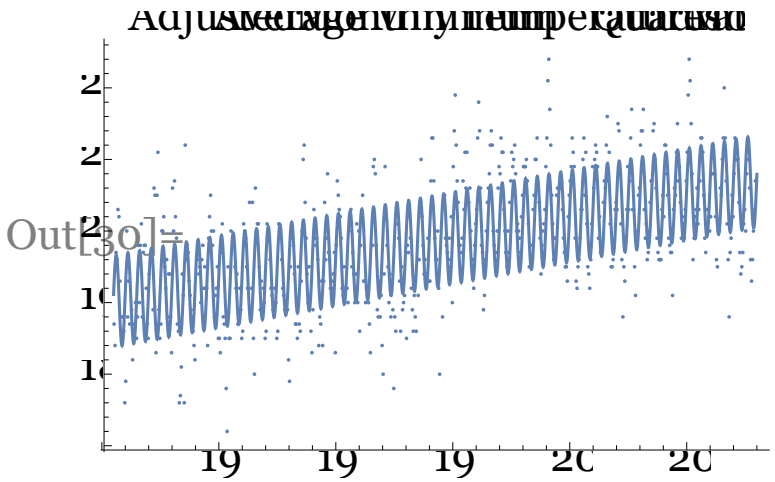
In[29]:=

```
lm2LinearModelFit[MinData, {x, Sin[2*Pi*x], Cos[2*Pi*x]}, x]
ShowListPlot[MinData, Plot[lm2[x], {x, 1961, 2016}],
PlotLabelHoldForm[Adjusted Average Monthly Minimum Temperature Quadratic Mode],
LabelStyle[GrayLevel]]
```

Out[29]=

```
FittedMo[-40.8326, x+0.0597428, Sin[8x]]
```

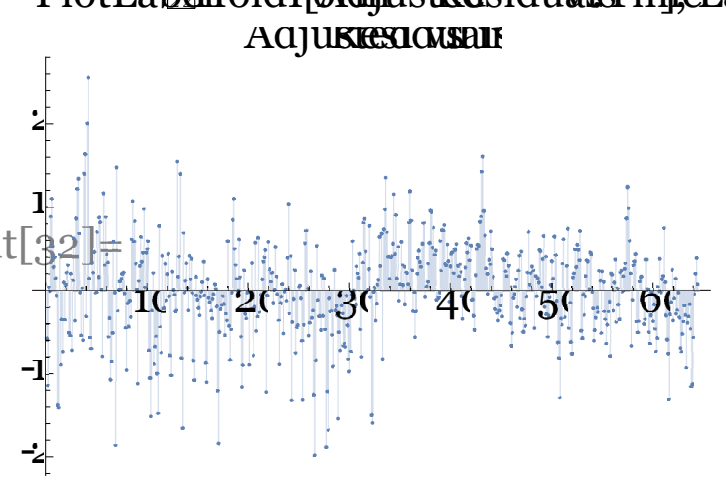
Out[30]=



In[31]:=

```
ListPlot[lm2FitResiduals, Filling Axis,
PlotLabelHoldForm[Adjusted Residuals Time], LabelStyle[GrayLevel]]
```

Out[32]=



In[33]:=

```
(*There is still a pattern in the residuals*)
```

In[34]:=

```
lm2RSquar
```

Out[35]=

```
0.5735
```

In[36]:=

```
lm2ParameterConfidence[]
```

Out[37]=

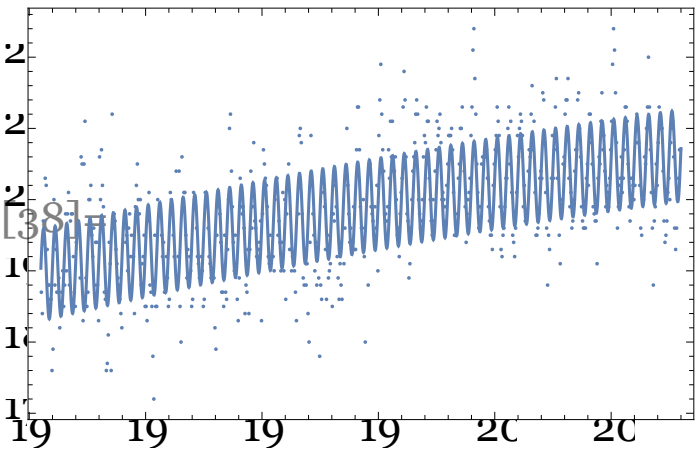
```
{3-46.4293, 35.2359, 0.0277055, 0.0333335, 0.572202, 0.698114, 0.0343033, 0.0360055}
```

In[36]:= (*All parameters significant*)

In[37]:= qm2 = LinearModelFit[MinData, {x^2, Sin[2*Pi*x], Cos[2*Pi*x]}, x]

ShowListPlot[MinData, Plot[qm2, {x, 1961, 2016}], FrameTrue]

Out[37]= FittedMo[-642.247635 + 0.097960 + 0.634512 x]



Out[38]=

In[39]:= qm2RSquar[

Out[39]= 0.5751

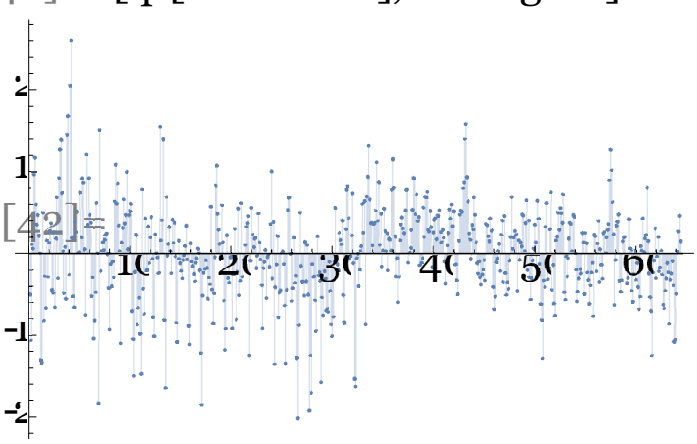
In[40]:= qm2ParameterConfidence[

Out[40]= {-1424.3139, 825.-0.151167, 7.42199}

{-0.000349854, 0.000456801, 0.0269774}, {0.0348953, 0.1610}

In[41]:= (*Only the sin and cos parameters significant*)

In[42]:= ListPlot[qm2FitResiduals, Filling Axis]



Out[42]=