In[137]:=
```
<< Eidomatica`
SetDirectory[NotebookDirectory[]];
$HistoryLength = 0;
```

lib: Can't find "libEidomatica" at /Users/scherni/Library/Mathematica/Applications/Eidomatica/LibraryResources/MacOSX-x86-64/libEidomatica. Some functions may work.

```
Revisions: {Eidomatica Package: 347, libEidomatica: Unknown}
```

Import data

Directories

In[124]:=
```
sample1 = "../results/sample-1/plots/";
sample2 = "./results/sample-2/plots/";
sample3 = "./results/sample-3/plots/";
directories = {sample1, sample2, sample3}
```

Out[127]=
```
{../results/sample-1/plots/,
 ./results/sample-2/plots/, ./results/sample-3/plots/}
```

Cell Position Data

```
sample1 = Import["../test-data/sample-1/data.mx"];
sample2 = Import["../test-data/sample-2/data.mx"];
sample3 = Import["../test-data/sample-3/data.mx"];
data = {sample1, sample2, sample3};
```

Tracks

In[132]:=
```
sample1Tracks = Import["../test-data/sample-1/tracks.wdx"];
sample2Tracks = Import["../test-data/sample-2/tracks.wdx"];
sample3Tracks = Import["../test-data/sample-3/tracks.wdx"];
tracks = {sample1Tracks, sample2Tracks, sample3Tracks};
```

Densities

```
sample1Bonne = Import["../test-data/sample-1/densities250-bonne.mx"];
sample2Bonne = Import["../test-data/sample-2/densities250-bonne.mx"];
sample3Bonne = Import["../test-data/sample-3/densities250-bonne.mx"];
bonne = {sample1Bonne, sample2Bonne, sample3Bonn2};

sample1Densities = Import["../test-data/sample-1/densities250.mx"];
sample2Densities = Import["../test-data/sample-2/densities250.mx"];
sample3Densities = Import["../test-data/sample-3/densities250.mx"];
densities = {sample1Densities, sample2Densities, sample3Densities};
```

Colors

In[136]:=
```
colors = ColorData[109, #] & /@ {14, 13, 15}
```

Out[136]=
```
{■, ■, ■}
```

Cell counts

Absolute cell counts

```
data // Dimensions
```

```
{3, 3, 420, 3}
```

```
data[[All, All, All, 1]] // Dimensions
```

```
{3, 3, 420}
```

```
counts = Map[Length, data[[All, All, All, 1]], {3}];
```

```
{counts, Total /@ counts} // Dimensions
```

```
{2, 3}
```

Relative cell counts

```
totals = Total /@ counts;
relatives = Table[# / totals[[i]] & /@ counts[[i]], {i, 1, Length@counts}];
```

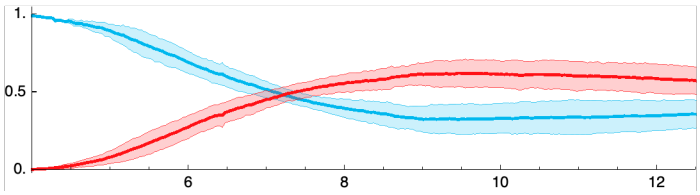
```
Dimensions@relatives
```

```
{3, 3, 420}
```

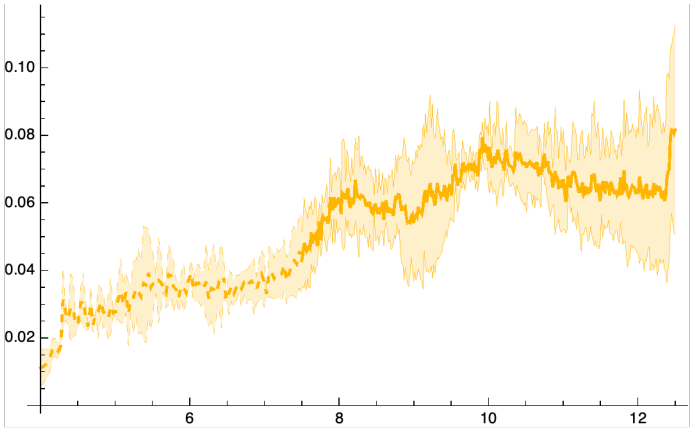
```
SetOptions[ConfidencePlot, BaseStyle -> {8, FontFamily → "Helvetica"}];
ticks = Table[If[EvenQ[i], {i, i, {.01, 0}}, {i, "", {.005, 0}}], {i, 5, 12}]
```

```
{{5, , {0.005, 0}}, {6, 6, {0.01, 0}}, {7, , {0.005, 0}}, {8, 8, {0.01, 0}},
 {9, , {0.005, 0}}, {10, 10, {0.01, 0}}, {11, , {0.005, 0}}, {12, 12, {0.01, 0}}}
```

```
first = Show[MapThread[ConfidencePlot[Transpose@#1, Color → #2,
      PlotRange → {{4., 12.5}, All}, DataRange → {4, 18}, AxesOrigin → {4., 0}] &,
    Most /@ {Transpose[relatives], colors}], AspectRatio → 1 / 4,
  Ticks → {Automatic, {0., .5, 1.}}]
```



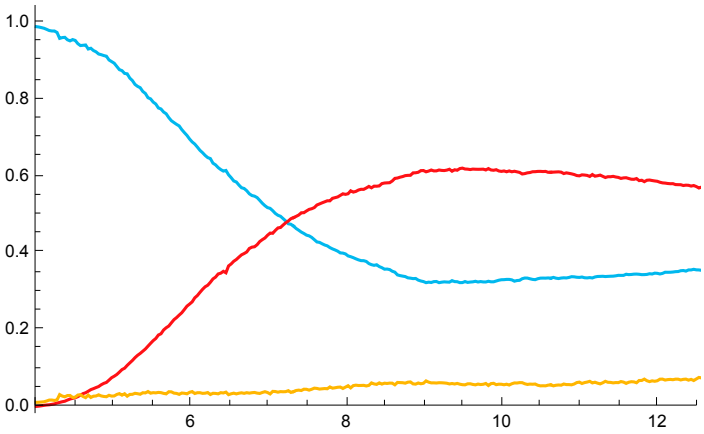
```
last = Show[{
      ConfidencePlot[Transpose@(Take[#, 105] & /@ #[[1]]), Color → #[[2]],
       LineStyle → Dashed, DataRange → {4., 7.5}, AxesOrigin → {4., 0}],
      ConfidencePlot[Transpose@(Drop[#, 105] & /@ #[[1]]), Color → #[[2]],
       DataRange → {7.5, 12.5}, AxesOrigin → {4., 0}]}, PlotRange → All
   ] &@(Last /@ {Transpose[relatives], colors})
```




```
gr = Show[first, last];
```

```
Export["../tresults/relative_cell_counts+1,96*standard_error.pdf", gr]
```

```
ListLinePlot[Mean /@ Transpose@relatives, PlotStyle → colors,
 PlotRange → {{4., 12.5}, All}, DataRange → {4, 18}, AxesOrigin → {4., 0}]
```




```
MapThread[
 ListLinePlot[Transpose@#1, PlotStyle → #2, PlotRange → {{4., 12.5}, All},
   DataRange → {4, 18}, AxesOrigin → {4., 0}] &, {Transpose[relatives], colors}]
```

```
Export["../results/relative-cell_counts.pdf", Show[
  MapThread[ConfidencePlot[Transpose@#1, Color → #2, PlotRange → {All, All}] &,
   {Transpose[relatives], colors}]]]
```

Radii

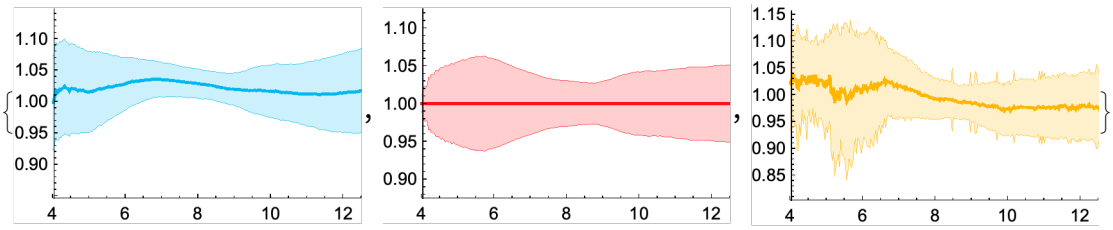
```
radii = Map[Norm@Last@# &, data[[All, All, All, 1]], {4}];
```

```
sample1Mean = Map[Mean, radii[[1]], {2}];
```

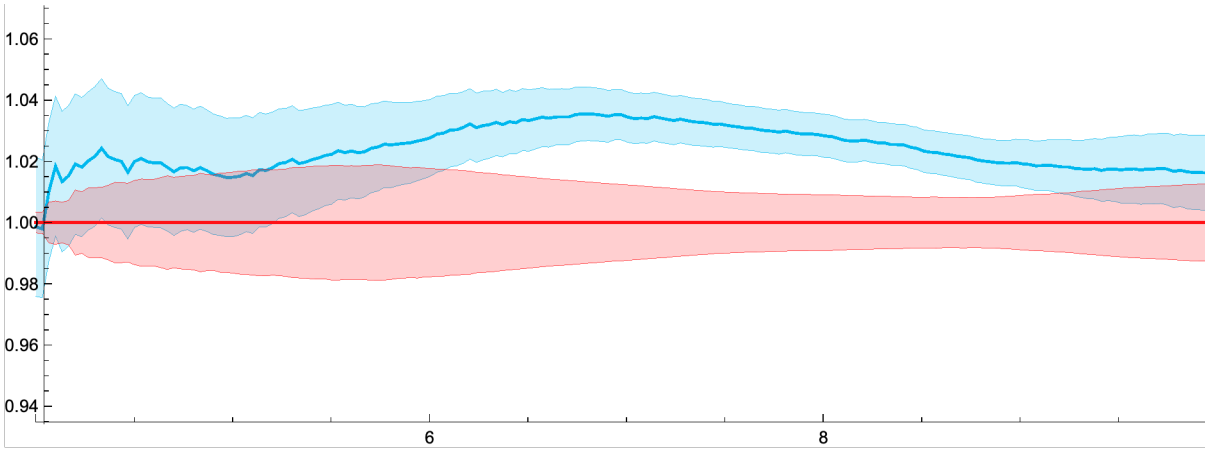
```
radii // Dimensions
```

```
{3, 3, 420}
```

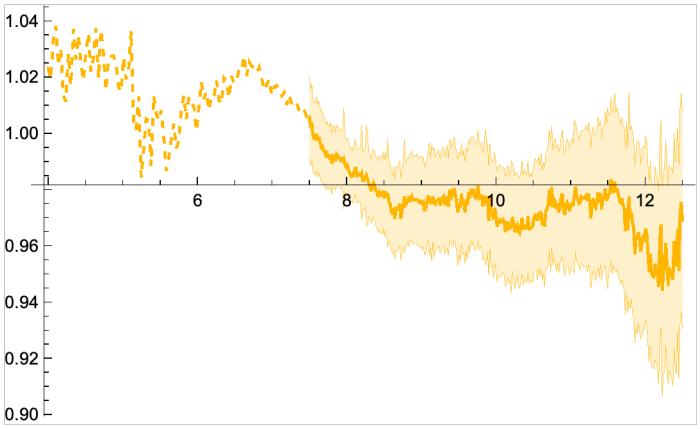
```
MapThread[StandardDeviationPlot[#1 / sample1Mean[[2]], Color → #2,
    DataRange → {4, 18}, PlotRange → {{4., 12.5}, All}] &, {radii[[1]], colors}]
```




```
first = Show[MapThread[StandardDeviationPlot[#1 / sample1Mean[[2]], Color → #2,
      DataRange → {4, 18}, PlotRange → {{4., 12.5}, All}, DeviationScaling → .3] &,
    Most /@ {radii[[1]], colors}], AspectRatio → 1 / 4]
```




```
last = Show[{
      StandardDeviationPlot[(Take[#[[1]] / sample1Mean[[2]], 105]), Color → #[[2]],
       LineStyle → Dashed, DataRange → {4., 7.5}, DeviationScaling → 0],
      StandardDeviationPlot[(Drop[#[[1]] / sample1Mean[[2]], 105]), Color →
        #[[2]], DataRange → {7.5, 12.5}, DeviationScaling → .3]}, PlotRange → All
    ] &@ (Last /@ {radii[[1]], colors})
```




```
Export["../results/radii+scaled-standard_deviation.pdf", Show[first, last]]
```

Population radii

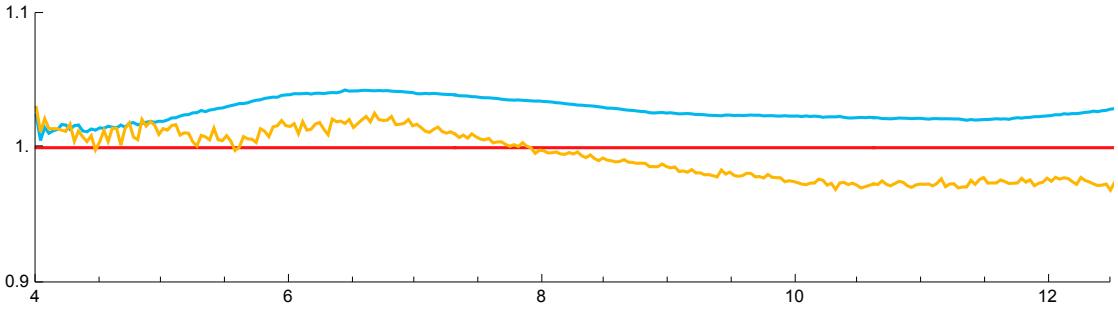
```
means = Map[Mean, radii, {3}];
```

```
means // Dimensions
```

```
{3, 3, 420}
```

```
normalization = Table[Mean@Flatten@means[[All, 2, i]], {i, 1, 420}];
```

```
gr = Show[MapThread[ListLinePlot[Mean@#1 / #3, PlotStyle → #2, ImageSize → Large,
       DataRange → {4, 18}, PlotRange → {{4., 12.5}, {.9, 1.1}}] &,
    {Transpose@means, colors, ConstantArray[normalization, 3]}],
  AxesOrigin → {4., .9}, AspectRatio → 1 / 4, Ticks → {Automatic, {.9, 1., 1.1}}]
```




```
Export["../radii_long2.pdf", gr]
```

```
/Users/kthierbach/Dropbox/shared/zebrafish_paper/figures/Fig2/pics/radii_long2.
  pdf
```