

In[1]:= **f1 = (YR1s - YR2s) / (YR1 - YR2)**

f2 = (YTmax - YTmin) / (YMmax - YMmin)

Again = f2 (YR1s - YR2s)

Aoffs = YTmax - Again (YMmax - YR1s) / (YR1s - YR2s)

Yout = Again (Ypix - YR1) / (YR1 - YR2) + Aoffs

Out[1]=
$$\frac{YR1s - YR2s}{YR1 - YR2}$$

Out[2]=
$$\frac{YTmax - YTmin}{YMmax - YMmin}$$

Out[3]=
$$\frac{(YR1s - YR2s) (YTmax - YTmin)}{YMmax - YMmin}$$

Out[4]=
$$YTmax - \frac{(YMmax - YR1s) (YTmax - YTmin)}{YMmax - YMmin}$$

Out[5]=
$$YTmax - \frac{(YMmax - YR1s) (YTmax - YTmin)}{YMmax - YMmin} + \frac{(Ypix - YR1) (YR1s - YR2s) (YTmax - YTmin)}{(YMmax - YMmin) (YR1 - YR2)}$$

In[6]:= **Yout = f1 f2 (Ypix - YR1) - f2 (YMmax - YR1s) + YTmax**

Yout /. {YR1 → YR1s, YR2 → YR2s, Ypix → YMmin} // Simplify

Yout /. {YR1 → YR1s, YR2 → YR2s, Ypix → YMmax} // Simplify

Yout /. {YR1 → YR1s, YR2 → YR2s, Ypix → (YMmin + YMmax) / 2} // Simplify

Out[6]=
$$YTmax - \frac{(YMmax - YR1s) (YTmax - YTmin)}{YMmax - YMmin} + \frac{(Ypix - YR1) (YR1s - YR2s) (YTmax - YTmin)}{(YMmax - YMmin) (YR1 - YR2)}$$

Out[7]= **YTmin**

Out[8]= **YTmax**

Out[9]=
$$\frac{YTmax + YTmin}{2}$$

In[10]:= **sf1 = D[Yout, YR1s] // Simplify**

Out[10]=
$$\frac{(Ypix - YR2) (YTmax - YTmin)}{(YMmax - YMmin) (YR1 - YR2)}$$

In[11]:= **sf2 = D[Yout, YR2s] // Simplify**

Out[11]=
$$- \frac{(Ypix - YR1) (YTmax - YTmin)}{(YMmax - YMmin) (YR1 - YR2)}$$

In[12]:= **sf3 = D[Yout, YR1] // Simplify**

Out[12]=
$$- \frac{(Ypix - YR2) (YR1s - YR2s) (YTmax - YTmin)}{(YMmax - YMmin) (YR1 - YR2)^2}$$

In[13]:= **sf4 = D[Yout, YR2] // Simplify**

$$\text{Out[13]} = \frac{(Y_{pix} - YR1)(YR1s - YR2s)(YTmax - YTmin)}{(YMmax - YMmin)(YR1 - YR2)^2}$$

In[14]:= **sf5 = D[Yout, YMmin]**

$$\text{Out[14]} = -\frac{(YMmax - YR1s)(YTmax - YTmin)}{(YMmax - YMmin)^2} + \frac{(Y_{pix} - YR1)(YR1s - YR2s)(YTmax - YTmin)}{(YMmax - YMmin)^2(YR1 - YR2)}$$

In[15]:= **sf6 = D[Yout, YMmax]**

$$\text{Out[15]} = -\frac{YTmax - YTmin}{YMmax - YMmin} + \frac{(YMmax - YR1s)(YTmax - YTmin)}{(YMmax - YMmin)^2} - \frac{(Y_{pix} - YR1)(YR1s - YR2s)(YTmax - YTmin)}{(YMmax - YMmin)^2(YR1 - YR2)}$$

In[16]:= **sf7 = D[Yout, Ypix]**

$$\text{Out[16]} = \frac{(YR1s - YR2s)(YTmax - YTmin)}{(YMmax - YMmin)(YR1 - YR2)}$$

Māk

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In[17]:= sf1fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf1;
sf2fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf2;
sf3fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf3;
sf4fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf4;
sf5fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf5;
sf6fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf6;
sf7fn[YR1_, YR1s_, YR2_, YR2s_, YMmin_, YMmax_, YTmin_, YTmax_, Ypix_] = sf7;
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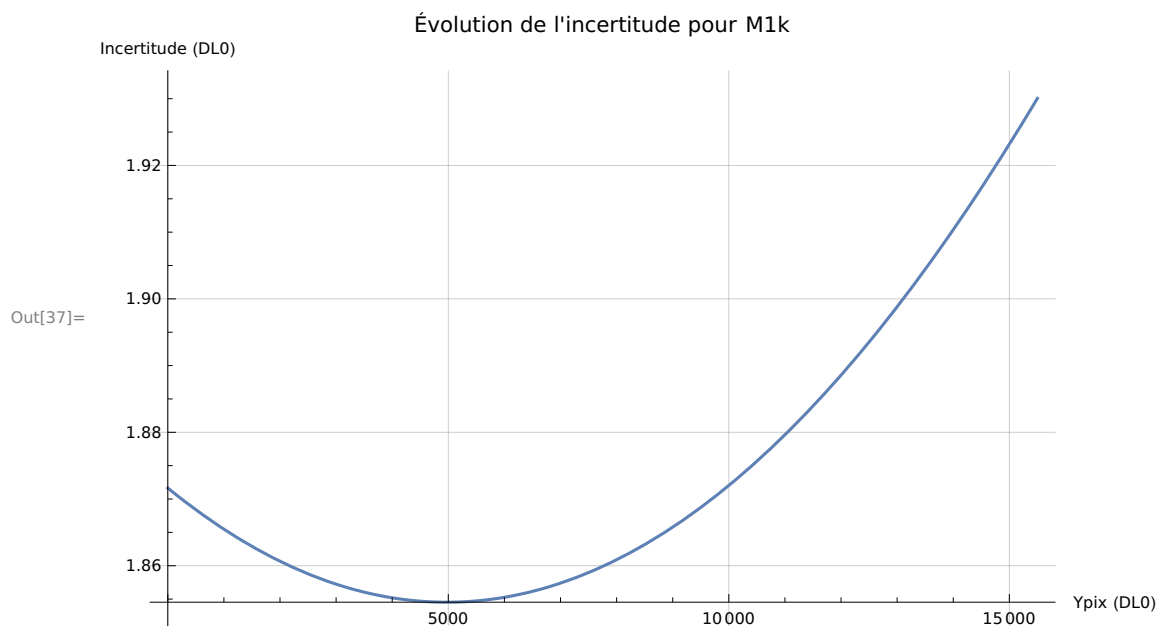
In[24]:= q1 = sf1fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q2 = sf2fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q3 = sf3fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q4 = sf4fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q5 = sf5fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q6 = sf6fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q7 = sf7fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
uYpix = 1.7;
uYMmin = 1.7 / Sqrt[64];
uYMmax = 1.7 / Sqrt[64];
uYR1 = uYR1s = uYR2 = uYR2s = 1.7 / Sqrt[120];
Clear[u]
u[Ypix_] = Sqrt[(q1 uYR1s)^2 + (q2 uYR2s)^2 +
  (q3 uYR1)^2 + (q4 uYR2)^2 + (q5 uYMmin)^2 + (q6 uYMmax)^2 + (q7 uYpix)^2];

```

```

In[37]:= Plot[u[Ypix], {Ypix, 0, 15500}, GridLines -> Automatic,
  AxesLabel -> {"Ypix (DL0)", "Incertitude (DL0)"},
  PlotLabel -> "Évolution de l'incertitude pour M1k"]

```



```

In[38]:= q1max = sf1fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q2max = sf2fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q3max = sf3fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q4max = sf4fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q5max = sf5fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q6max = sf6fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q7max = sf7fn[7800.0, 7800.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
u[15500]

Out[38]= 2.2058

Out[39]= -1.12481

Out[40]= -2.2058

Out[41]= 1.12481

Out[42]=  $-1.11022 \times 10^{-16}$ 

Out[43]= -1.08099

Out[44]= 1.08099

Out[45]= 1.93006

```

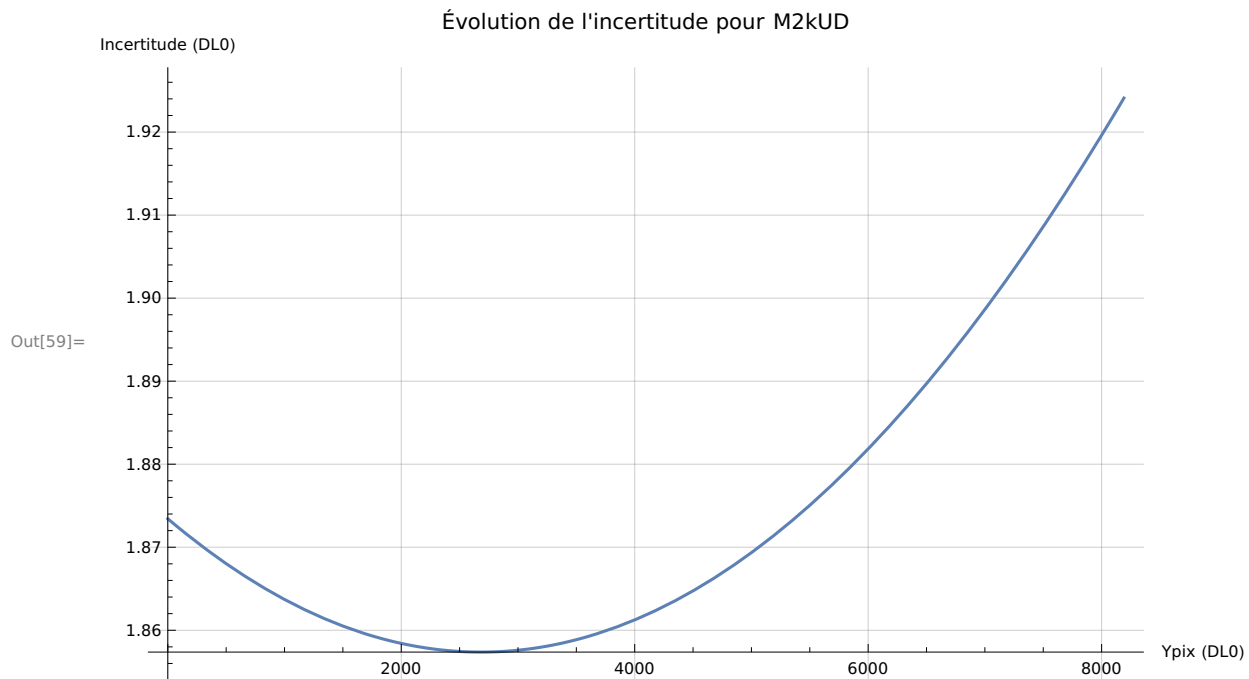
MaUD

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In[46]:= q1 = sf1fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q2 = sf2fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q3 = sf3fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q4 = sf4fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q5 = sf5fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q6 = sf6fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
q7 = sf7fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, Ypix];
uYpix = 1.7;
uYMmin = 1.7 / Sqrt[64];
uYMmax = 1.7 / Sqrt[64];
uYR1 = uYR1s = uYR2 = uYR2s = 1.7 / Sqrt[120];
Clear[u]
u[Ypix_] = Sqrt[(q1 uYR1s)^2 + (q2 uYR2s)^2 +
  (q3 uYR1)^2 + (q4 uYR2)^2 + (q5 uYMmin)^2 + (q6 uYMmax)^2 + (q7 uYpix)^2];

```

```
In[59]:= Plot[u[yPix], {yPix, 0, 8191}, GridLines → Automatic,
  AxesLabel → {"Ypix (DL0)", "Incertitude (DL0)"},
  PlotLabel → "Évolution de l'incertitude pour M2kUD"]
```



```
In[60]:= q1max = sf1fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q2max = sf2fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q3max = sf3fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q4max = sf4fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q5max = sf5fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q6max = sf6fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
q7max = sf7fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15 500.0, 650, 16 000, 8191]
u[8191]
```

```
Out[60]= 2.21631
```

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Out[61]= -1.13532
```

```
Out[62]= -2.21631
```

```
Out[63]= 1.13532
```

```
Out[64]= -0.556403
```

```
Out[65]= -0.524583
```

```
Out[66]= 1.08099
```

```
Out[67]= 1.92409
```

```

In[68]:= q1max = sf1fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q2max = sf2fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q3max = sf3fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q4max = sf4fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q5max = sf5fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q6max = sf6fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
q7max = sf7fn[4200.0, 4200.0, 400.0, 400.0, 1300.0, 15500.0, 650, 16000, 15500]
u[15500]

```

```
Out[68]= 4.2955
```

```
Out[69]= -3.21451
```

```
Out[70]= -4.2955
```

```
Out[71]= 3.21451
```

```
Out[72]= 0.
```

```
Out[73]= -1.08099
```

```
Out[74]= 1.08099
```

```
Out[75]= 2.1946
```