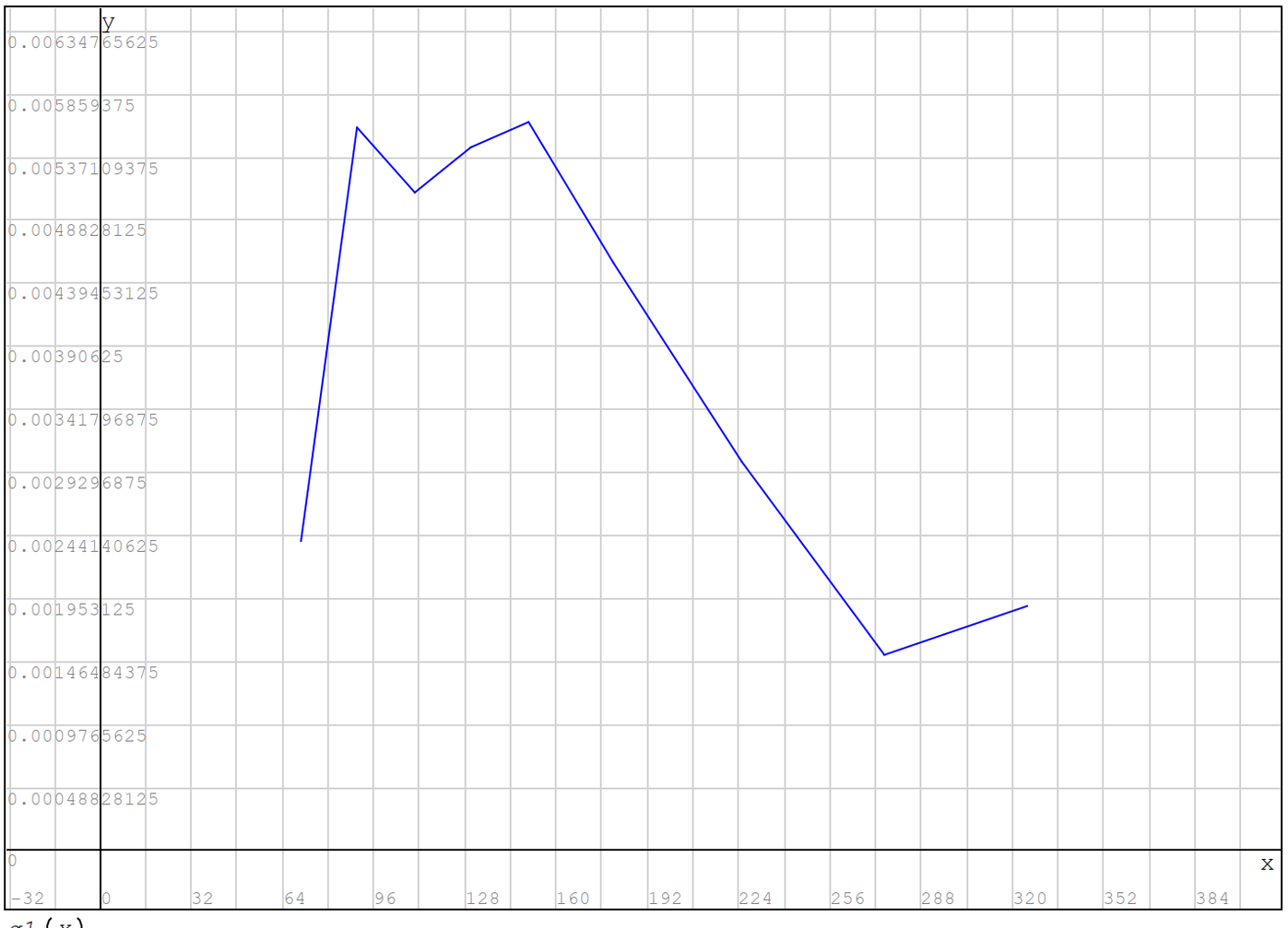
underlying data

$$x := \begin{bmatrix} 70 \\ 90 \\ 110 \\ 130 \\ 150 \\ 180 \\ 225 \\ 275 \\ 325 \end{bmatrix} \quad y := \begin{bmatrix} 0.0024 \\ 0.0056 \\ 0.0051 \\ 0.00545 \\ 0.00565 \\ 0.00455 \\ 0.00302 \\ 0.00152 \\ 0.0019 \end{bmatrix} \quad g1(x) := \begin{bmatrix} 70 & 0.0024 \\ 90 & 0.0056 \\ 110 & 0.0051 \\ 130 & 0.00545 \\ 150 & 0.00565 \\ 180 & 0.00455 \\ 225 & 0.00302 \\ 275 & 0.00152 \\ 325 & 0.0019 \end{bmatrix}$$



$g1(x)$

we introduce a formula for the approximation $a1 := \text{eval}\left(100 \cdot \sqrt{2 \cdot \pi}\right)$

$$Wb := \left(\frac{h1}{\sigma1 \cdot a1}\right) \cdot \exp\left(-\frac{(x-\mu1)^2}{2 \cdot \sigma1^2}\right) + \left(\frac{h2}{\sigma2 \cdot a1}\right) \cdot \exp\left(\frac{-(x-\mu2)^2}{2 \cdot \sigma2^2}\right) + \left(\frac{h3}{\sigma3 \cdot a1}\right) \cdot \exp\left(\frac{-(x-\mu3)^2}{2 \cdot \sigma3^2}\right)$$

initial values of 9 parameters

$h1 := 0$ $h2 := 0$ $h3 := 0$
$\mu1 := 50$ $\mu2 := 100$ $\mu3 := 200$
$\sigma1 := 1$ $\sigma2 := 1$ $\sigma3 := 1$

10 parameters that need to be calculated, we set arbitrary values for now

$Sqmin := 1$ $hh1 := 0.15$ $hh2 := 0.7$ $hh3 := 0.40$
$\mu\mu1 := 90$ $\mu\mu2 := 160$ $\mu\mu3 := 350$
$\sigma\sigma1 := 19$ $\sigma\sigma2 := 50$ $\sigma\sigma3 := 80$

The difference between the original data and those calculated by the formula

$Raz(h1;h2;h3;\mu1;\mu2;\mu3;\sigma1;\sigma2;\sigma3) := \text{eval}(y - Wb)$

the sum of the squares of the deviations of the initial data from the desired function

$$Sq(h1;h2;h3;\mu1;\mu2;\mu3;\sigma1;\sigma2;\sigma3) := \sum \left(\overrightarrow{Raz(h1;h2;h3;\mu1;\mu2;\mu3;\sigma1;\sigma2;\sigma3)^2}\right)$$

we iterate through the parameters to minimize the sum of the squared deviations

$t0 := \text{time}(0)$

$$loop := \begin{bmatrix} "h1" & 1 & 100 \\ "h2" & 1 & 100 \\ "h3" & 1 & 100 \\ "\mu 1" & 51 & 200 \\ "\mu 2" & 101 & 350 \\ "\mu 3" & 201 & 500 \\ "\sigma 1" & 1 & 80 \\ "\sigma 2" & 1 & 100 \\ "\sigma 3" & 1 & 150 \end{bmatrix}$$

$loop := \text{augment}(loop_{[1..9][1..3]}; \text{col}(loop; 2))$

for $t \in [1..10]$

- if $secondary = 1$ — if $t > 1$
  - $loop := \text{augment}(loop_{[1..9]1}; \text{col}(loop; 4); \text{col}(loop; 3); \text{col}(loop; 4))$
- else
  - $loop := \text{augment}(loop_{[1..9][1..2]}; \text{col}(loop; 4); \text{col}(loop; 4))$
- $Sqmin := 1$ — otherwise
- for $i\# \in [9..1]$
  - ""
  - for $j\# \in [(loop_{i\#\,2})..(loop_{i\#\,3})]$
    - $tmp\#_{i\#} := j\#$
    - $\begin{bmatrix} h1 := tmp\#_1 & h2 := tmp\#_2 & h3 := tmp\#_3 \\ \mu 1 := tmp\#_4 & \mu 2 := tmp\#_5 & \mu 3 := tmp\#_6 \\ \sigma 1 := tmp\#_7 & \sigma 2 := tmp\#_8 & \sigma 3 := tmp\#_9 \end{bmatrix}$
    - $Sq := Sq(h1; h2; h3; \mu 1; \mu 2; \mu 3; \sigma 1; \sigma 2; \sigma 3)$
    - if $Sq < Sqmin$
      - $loop_{i\#\,4} := j\#$
      - $Sqmin := Sq$
      - $secondary := 0$
    - otherwise
      - $Sqmin := Sqmin$
- $h1 := loop_{1\,4}$
- for $i\# \in [1..9]$
  - for $j\# \in [(loop_{i\#\,4})..(loop_{i\#\,3})]$
    - $tmp\#_{i\#} := j\#$
    - $\begin{bmatrix} h1 := tmp\#_1 & h2 := tmp\#_2 & h3 := tmp\#_3 \\ \mu 1 := tmp\#_4 & \mu 2 := tmp\#_5 & \mu 3 := tmp\#_6 \\ \sigma 1 := tmp\#_7 & \sigma 2 := tmp\#_8 & \sigma 3 := tmp\#_9 \end{bmatrix}$
    - $Sq := Sq(h1; h2; h3; \mu 1; \mu 2; \mu 3; \sigma 1; \sigma 2; \sigma 3)$
    - if $Sq < Sqmin$
      - $loop_{i\#\,4} := j\#$
      - $Sqmin := Sq$
      - $secondary := 1$
    - otherwise
      - $Sqmin := Sqmin$
- $\sigma 3 := loop_{9\,4}$

$$\begin{bmatrix} hh1 := h1 \cdot 0.01 & hh2 := h2 \cdot 0.01 & hh3 := h3 \cdot 0.01 \\ \mu\mu 1 := \mu 1 & \mu\mu 2 := \mu 2 & \mu\mu 3 := \mu 3 \\ \sigma\sigma 1 := \sigma 1 & \sigma\sigma 2 := \sigma 2 & \sigma\sigma 3 := \sigma 3 \end{bmatrix}$$

Here in the loop, Sq should be calculated and compared with Sqmin. The parameters under which the condition is met are saved

Dear alles,
Thank you for correcting my mistake.
But the desired result still did not work.
There, for some reason, the search of options stopped at the value of hh1 = 0.01, respectively, and hh2 = 001, hh3 = 0.01. That is, h1, h2, and h3 were only checked when the value =1.
Whereas I expected that the iteration of options should reach hh1 = hh2 = hh3 = 1, respectively h1 = h2 = h3 = 100.
For other parameters, it also seems that the search for options has not reached the end.
That is why the resulting graph shows a complete mismatch between the original data and the approximating formula.
I don't have an error in the If statement?
There I put continue in the else field.

$$loop = \begin{bmatrix} "h1" & 44 & 48 & 48 \\ "h2" & 8 & 8 & 8 \\ "h3" & 100 & 100 & 100 \\ "\mu 1" & 131 & 131 & 131 \\ "\mu 2" & 350 & 350 & 350 \\ "\mu 3" & 201 & 201 & 201 \\ "\sigma 1" & 67 & 67 & 67 \\ "\sigma 2" & 100 & 100 & 100 \\ "\sigma 3" & 150 & 150 & 150 \end{bmatrix}$$

$Sqmin := Sq(h1; h2; h3; \mu 1; \mu 2; \mu 3; \sigma 1; \sigma 2; \sigma 3)$

$Sqmin = 0.000006088469608$

Here the program should print the value of the smallest square of the deviation and the values of the 9 parameters at which this is achieved

$h1 = 48$ $h2 = 8$ $h3 = 100$ $hh1 = 0.48$ $hh2 = 0.08$ $hh3 = 1$

$\mu 1 = 131$ $\mu 2 = 350$ $\mu 3 = 201$ $\mu\mu 1 = 131$ $\mu\mu 2 = 350$ $\mu\mu 3 = 201$

$\sigma 1 = 67$ $\sigma 2 = 100$ $\sigma 3 = 150$ $\sigma\sigma 1 = 67$ $\sigma\sigma 2 = 100$ $\sigma\sigma 3 = 150$

$$wh1(x) := \frac{hh1}{\sigma\sigma 1 \cdot \sqrt{2 \cdot \pi}} \cdot \exp\left(-\frac{(x - \mu\mu 1)^2}{2 \cdot \sigma\sigma 1^2}\right)$$

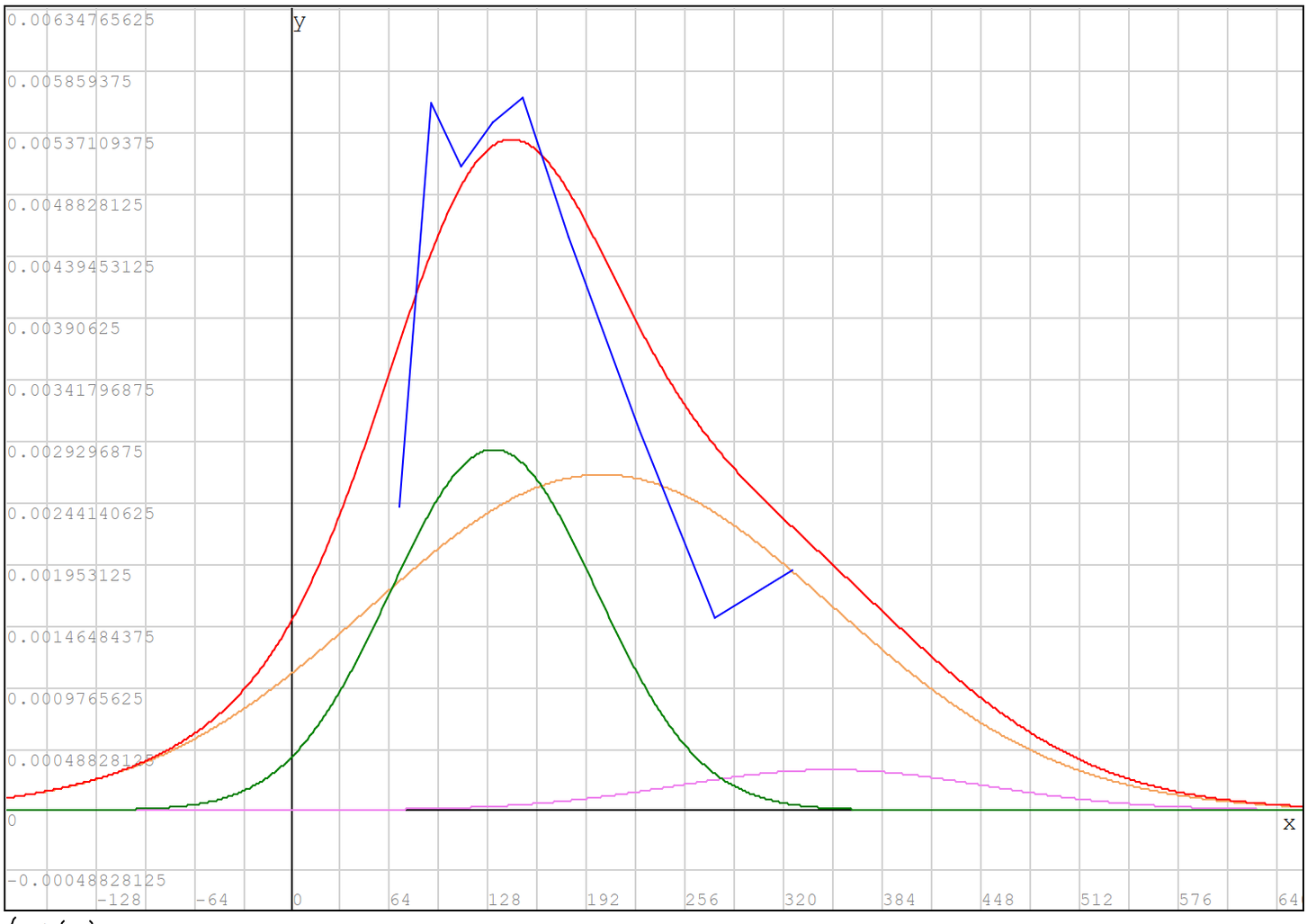
$$wh2(x) := \frac{hh2}{\sigma\sigma 2 \cdot \sqrt{2 \cdot \pi}} \cdot \exp\left(-\frac{(x - \mu\mu 2)^2}{2 \cdot \sigma\sigma 2^2}\right)$$

$$wh3(x) := \frac{hh3}{\sigma\sigma 3 \cdot \sqrt{2 \cdot \pi}} \cdot \exp\left(-\frac{(x - \mu\mu 3)^2}{2 \cdot \sigma\sigma 3^2}\right)$$

Draw the resulting graphs.
Three normal distributions and their sum with different weights

$WW(x) := wh1(x) + wh2(x) + wh3(x)$

$\text{time}(1) - t0 = 468$ s



$g1(x)$
$WW(x)$
$wh1(x)$
$wh2(x)$
$wh3(x)$