Data from 10mm gauge block of EIM_DIM_01 in nm

$l_1 := 0$ $\quad l_2 := 10$ $\quad l_3 := 10$ $\quad l_4 := 20$ $\quad l_5 := 10$ $\quad u_x := 14.9$

v evaluated as usual: $\quad v_a := \max(l_1, l_2, l_3, l_4, l_5) - \min(l_1, l_2, l_3, l_4, l_5)$

Evaluation with infinite degrees of freedom

$N := 200000$

$D1 := \mathrm{rnorm}(N, l_1, u_x) \quad D2 := \mathrm{rnorm}(N, l_2, u_x) \quad D3 := \mathrm{rnorm}(N, l_3, u_x)$

$D4 := \mathrm{rnorm}(N, l_4, u_x) \quad D5 := \mathrm{rnorm}(N, l_5, u_x)$

$D := \mathrm{augment}(D1, D2, D3, D4, D5)$

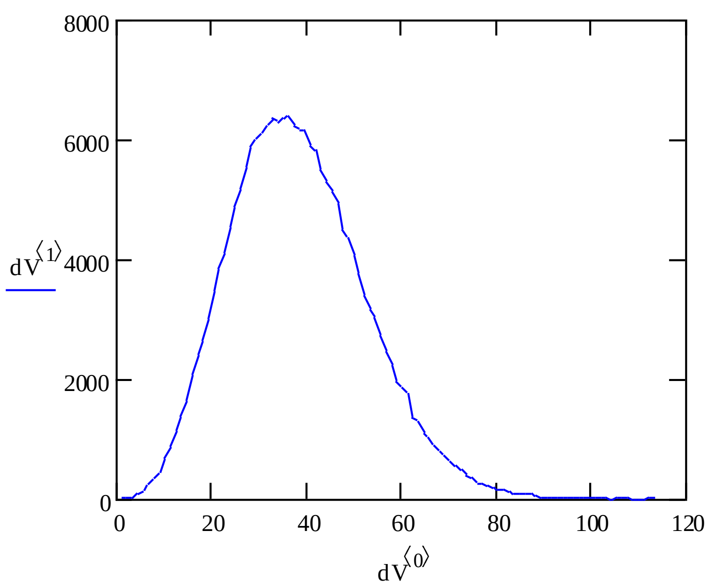
$$V := \text{for } i \in 0..N-1$$
$$\quad w_i \leftarrow \max(D_{i,0}, D_{i,1}, D_{i,2}, D_{i,3}, D_{i,4}) - \min(D_{i,0}, D_{i,1}, D_{i,2}, D_{i,3}, D_{i,4})$$

$u_X := \mathrm{stdev}(V)$

confidence interval calculation: $\quad s := \mathrm{sort}(V) \quad s_{10000} = 17.147 \quad s_{190000} = 63.25$

$dV := \mathrm{histogram}(100, V)$

$\mathrm{mean}(V) = 38.445 \quad u_X = 14.083$



Evaluation with finite degrees of freedom $\qquad \nu := 3$

$$
v := \left|
\begin{array}{l}
n \leftarrow 200 \\
m \leftarrow 1000 \\
U \leftarrow \sqrt{\dfrac{u_X^{\,2}}{\nu}\cdot \mathrm{rchisq}(n,\nu)} \\
\text{for } j \in 0..n-1 \\
\quad \left|
\begin{array}{l}
d1 \leftarrow \mathrm{rnorm}(m, l_1, U_j) \\
d2 \leftarrow \mathrm{rnorm}(m, l_2, U_j) \\
d3 \leftarrow \mathrm{rnorm}(m, l_3, U_j) \\
d4 \leftarrow \mathrm{rnorm}(m, l_4, U_j) \\
d5 \leftarrow \mathrm{rnorm}(m, l_5, U_j) \\
d \leftarrow \mathrm{augment}(d1, d2, d3, d4, d5) \\
\text{for } i \in 0..m-1 \\
\quad z_{i,j} \leftarrow \max(d_{i,0}, d_{i,1}, d_{i,2}, d_{i,3}, d_{i,4}) - \min(d_{i,0}, d_{i,1}, d_{i,2}, d_{i,3}, d_{i,4}) \\
w_j \leftarrow \mathrm{Var}\left(z^{\langle j \rangle}\right)
\end{array}
\right. \\
\nu_{eff} \leftarrow \dfrac{2\cdot u_X^{\,4}}{\mathrm{Var}(w)} \\
y \leftarrow z^{\langle 0 \rangle} \\
\text{for } k \in 1..n-1 \\
\quad y \leftarrow \mathrm{stack}\left(y, z^{\langle k \rangle}\right) \\
\begin{pmatrix} \nu_{eff} \\ y \end{pmatrix}
\end{array}
\right.
$$

eff. degrees of fredom: $v_0 = 5.635$

confidence interval calculation: $s := \mathrm{sort}(v_1)$ $s_{10000} = 14.283$ $s_{190000} = 67.597$

$dv := \mathrm{histogram}\left(dV^{\langle 0 \rangle}, v_1\right)$