# Practical guide to computer simulations

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- Preface, page ix, line 7

  it served as seed for the this book $\rightarrow$
  it served as a seed for this book

- page 3, line 4 from bottom

  full stop after performed by the *linker*

- page 12, section head 1.1.2

  Artithmetic $\rightarrow$ Arithmetic

- page 13, line 6

  reminder $\rightarrow$ remainder

- page 13, line 18

  in () brackets left of a constant, variable or expression in brackets, e.g., in
  $\rightarrow$
  in () brackets left of a constant, variable or expression, e.g., in

- page 13, line 22

  addressB will point 4 bytes ahead of addressA
  $\rightarrow$
  addressB will point 4 bytes behind addressA

- page 15, third table

  `a|b` $\rightarrow$ `a^b`

  last paragraph: there seem to be two too large spaces (after `shift` and before `seq`)

- page 16, mathtest.c, line 9

  should read

  ```
  printf("%f %f %f\n", pow(M_E, 1.5),exp(1.5), log(1.0), log(M_E));
  ```

- page 17, footnote

  full stop is missing

- page 19, line 12

  `counter == n_max` → `counter != n_max`

  ( `!=x` should be in the same typeface as `counter` and `n_max`)

- page 23: line 9

  one could write `counter + 1;`
  →
  one could write `counter + 1`.

- page 27, line 2 from bottom

  no full stop after via

- page 32, line 8 from bottom

  prupose → purpose

- page 37, line 10

  In this case, where the function prototype is contained in a header file, the function prototype must be preceded by the key word, `external`...
  →
  In this case, where the function is not contained in the header file, the function prototype should be preceded by the key word `external`, ...

- page 44, line 12

  `variable1` → `number1`

- page 78, exercise (4)

  via the rectangle rule → via the trapezoid rule

- page 217, in `lin_eq.c`

  `#include <gsl/gsl_linalg.h>`
  is missing

- page 231, in Def. 7.9

  $p_X(x) = \dots (1-p)^{(n-k)}$ → $p_X(x) = \dots (1-p)^{(n-x)}$

- page 232, below Eq. (7.27)

  $\sum_i \frac{\mu^x}{x!}$ → $\sum_k \frac{\mu^k}{k!}$

- page 234, Eq. (7.33)

  $\int_{\infty}^{-\infty} (x - \mathrm{E}[X])^2 p_X(x)$ → $\int_{-\infty}^{\infty} dx\, (x - \mathrm{E}[X])^2 p_X(x)$

- page 234, Def. 7.34

  $F(x_{\text{med}}) \quad \rightarrow \quad F_X(x_{\text{med}})$

- page 234, Def. 7.15, Eq. (7.35)

  should read

$$p_X(x) = \begin{cases} 0 & x < a \\ \frac{1}{b-a} & a \leq x < b \\ 0 & x \geq b \end{cases}$$

- page 236, Def. 7.17, Eq. (7.39)

$$p_X(x) = \frac{1}{\mu} \exp\left(-x/\mu\right)$$

  $\rightarrow$

$$p_X(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{\mu} \exp\left(-x/\mu\right) & x \geq 0 \end{cases}$$

- page 237, Def. 7.19

  with real-valued parameters $\lambda > 0, x_0$
  $\rightarrow$ with real-valued parameter $\lambda > 0$

- page 238

  add after

  $X = \lim_{n\to\infty} \max\left\{X^{(1)}, X^{(2)}, \ldots, X^{(n)}\right\}$

  The Gumbel distribution arises by normalizing $X$ to variance 1 and having the maximum probability at $x = 0$.

  correspondingly, in the next sentence:

  such that they have zero mean $\quad\rightarrow\quad$ such that the maximum is at $x = 0$

- page 245, line 8

  $(a =, c = 11) \quad \rightarrow \quad (a = 25214903917, c = 11)$

- page 245, line 3 of Sec. 7.2.2

  $p_X(x_i) \quad \rightarrow \quad p_i = p_X(x_i)$

- page 245, line 7 of Sec. 7.2.2

  such that the sum $s_j \equiv \sum_{i=1}^{j} p_X(x_i)$ of the probabilities is larger than $u$, but $s_{j-1} \equiv \sum_{i=1}^{j-1} p_X(_i) < u$.

  $\rightarrow$

  such that for the sum $s_j \equiv \sum_{i=1}^{j} p_i$ of the probabilities the condition $s_j - 1 < u \leq s_j$ holds.

add after this:

For example, consider a discrete random variable with $p_1 = 1/8$, $p_2 = 1/4$, $p_3 = 1/2$ and $p_4 = 1/8$. Using this approach, e.g, if the random number is contained in the interval $]1/8, 3/8]$, the second outcome will be selected, see Fig.

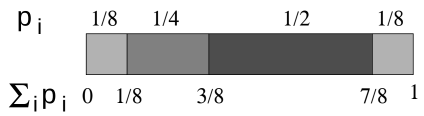


**Fig. X**: A discrete distribution with four outcomes with probabilities $p_1 = 1/8$, $p_2 = 1/4$, $p_3 = 1/2$ and $p_4 = 1/8$. The probabilities are represented in the interval $[0, 1]$ by sub intervals which have lengths equal to the probabilities, respectively. This allows to draw random numbers according the distribution.

- page 255, in Def. 7.23

  $u = u_\alpha(x_0, x_1, \ldots, x_{n-1}) \quad \rightarrow \quad u_\alpha = u_\alpha(x_0, x_1, \ldots, x_{n-1})$

- page 257, line 4 (in calculation $1 - \alpha =$)

  $P(-\overline{X} - z\sigma_{\overline{X}} \le -\mu \le -\overline{X} z\sigma_{\overline{X}})$
  $\rightarrow$
  $P(-\overline{X} - z\sigma_{\overline{X}} \le -\mu \le -\overline{X} + z\sigma_{\overline{X}})$

- page 258, last paragraph of 7.3.2

  $y_i = (x_i - \overline{x}) \quad \rightarrow \quad y_i = (x_i - \overline{x})^2$

- page 262, second item

  over some some distance $\rightarrow$ over some distance

- page 264, Eq. (7.66)

  should read

$$F_{H^*}(h_u) = F_{H^*}(h_l) = 1 - \alpha/2\,. \qquad (1)$$

- page 265, line 7

  After the sentence ending in $\alpha = 0.32$ uncertainty add

  The quantity corresponding to the standard error bar is $\sqrt{\mathrm{Var}[H]}$.

- page 267, line 11

  knwoledge $\rightarrow$ knowledge

- page 286, line8 from bottom

  whetheror → whether or

- page 293, paragraph after Eq. (7.69)

  add to the end of the paragraph:

  In case the two sample sizes are different, e.g, $n$ and $\hat{n}$, respectively, Eq. (7.69) must be changed to [1]

  $$\chi^2 = \frac{1}{n\hat{n}} \sum_k{}' \frac{(\hat{n}h_k - n\hat{h}_k)^2}{h_k + \hat{h}_k}$$

- page 297, lines from bottom

  for eaxample → for example

- page 313, footnote 18

  The "error bars" are calculated incorrectly in case the data points come with error bars and these are included in the fit, e.e.g when doing `fit f(x) "sg_e0_L.dat'' using 1:2:3 via e,a,b`. In this case one has to divide the given `Asymptotic Standard Error` by the `(stdfit)` value.

- page 314, top

  Instead of using the given C program, one can calculate $Q$ directly inside *gnuplot*:

  ```
  ndf = FIT_NDF
  chisq = FIT_STDFIT**2 * ndf
  Q = 1 - igamma(0.5 * ndf, 0.5 * chisq)
  ```

- page 316, line 6 of the comment box for `rand_discrete()`

  ```
  /** PARAMETERS: (*)= return-paramter                          **/
  ```
  →
  ```
  /** PARAMETERS: (*)= return-parameter                         **/
  ```

  (also in the corresponding boxes for `init_poisson()`, `rand_fisher_tippett()`, `variance()` and `bootstrap_ci()` on pages 316–318)

- page 316, line 6 of the comment box for `rand_poisson()`

  ```
  /** p(k)=mu^k*exp(-mu)/x!                                     **/
  ```
  →
  ```
  /** p(k)=mu^k*exp(-mu)/k!                                     **/
  ```

- page 318, end of exercise (3), line below formula for $s^2$

  rounding erros → rounding errors

- page 319, 1st line

  ```
  cc -o bt bootstrap_test.c bootstrap_ci.c mean.c -lm -DSOLUTION
  ```
  →
  ```
  cc -o bt bootstrap_test.c bootstrap_ci.c mean.c variance.c -lm -DSOLUTION
  ```

- page 320, exercise (6), 1st line after function prototype

  Hints: Use the functio → Hints: Use the function

# References


[1] N.D. Gagunashvili, Chi-Square Tests for Comparing Weighted Histograms, Nucl. Instrum. Meth. A **614**, 287–296 (2010)