Quality Assurance for R Graphics

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Overview

- An Anonymous Example
- Quality Assurance (in R)
- Quality Assurance for Graphics (in R)

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                 data=grid.text(5000)))
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- grid-0.7-2 (December 2002)

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  R: line 1: 26386 Segmentation fault
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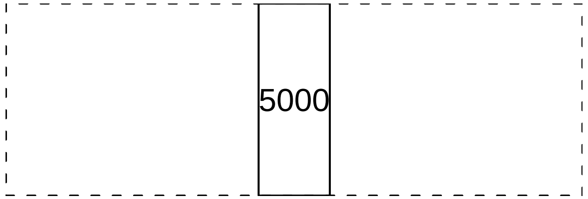
- grid-0.7-3 (December 2002)



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> grid.text(expression(sum(x[i],1,n)))
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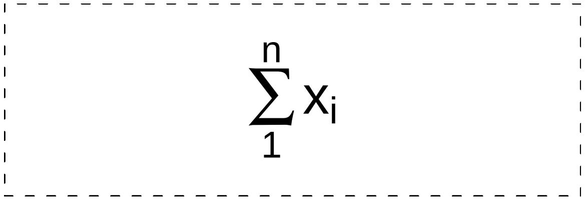

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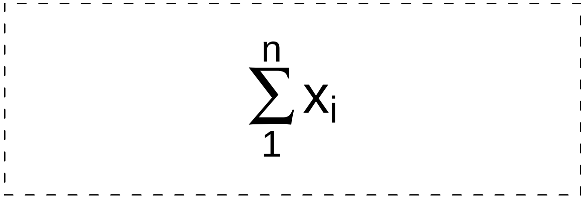

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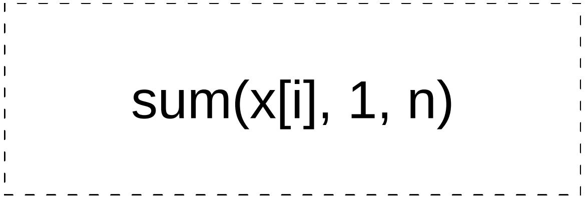

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- Everyone writes buggy code
- Not all bugs are so obvious
- There are a lot of cases to check

- **Quality Control:** need (automated) **tools** for **detecting** bugs.
- **Quality Assurance:** need **processes** for **preventing** the release of bugs

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Quality Assurance in R

- R has `make check` (and more)
- R has `R CMD check`
- Code must pass `make check` before it is committed to the repository
- A package must pass `R CMD check` before it is allowed on CRAN
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- Check that code runs **and** produces the correct output
- Need **model** output to compare against
- There are multiple output formats (devices)
- Bitmaps should be the basis for testing
  - Only some output devices use a text representation
  - A change in text representation may be unimportant
  - Will detect problems in 3rd party "viewers"
  - Easier to "see" problems
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- Tools for producing model output
- Tools for producing test output, comparing with model, and showing differences
- Linking these tools into `make check` and `R CMD check`
- Package `graphicsQC`
  - model.graphics()
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Package graphicsQC

```
test.graphics(funs = NULL,
              package = NULL,
              names = NULL,
              omit = NULL,
              width = 600, height = 600,
              device = postscript,
              format = "pbm",
              model.loc = ".",
              test.loc = model.loc,
              verbose = FALSE, quiet=FALSE,
              reset.rng = TRUE,
              ...)
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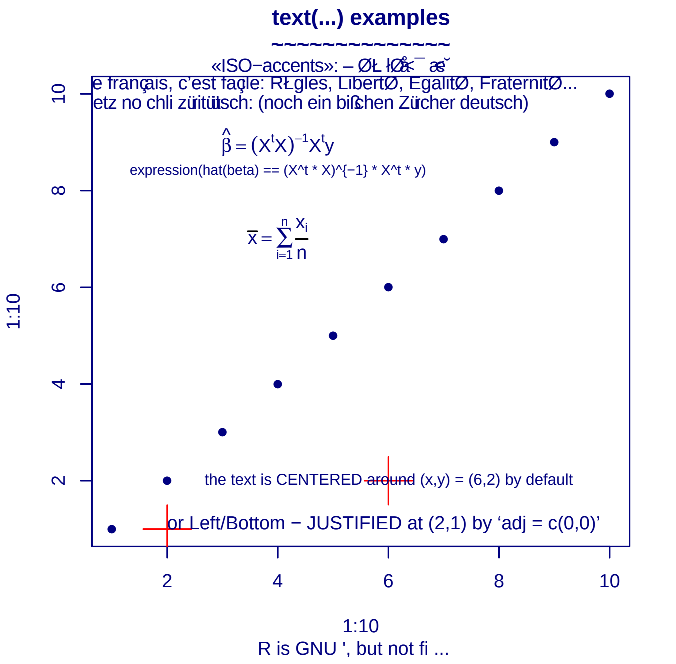
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«ISO−accents»: – ØŁ łØå<¯ æ˘
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etz no chli züritütsch: (noch ein bißchen Zürcher deutsch)
$\hat{\beta} = (X^tX)^{-1}X^ty$
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the text is CENTERED around (x,y) = (6,2) by default
or Left/Bottom − JUSTIFIED at (2,1) by 'adj = c(0,0)'
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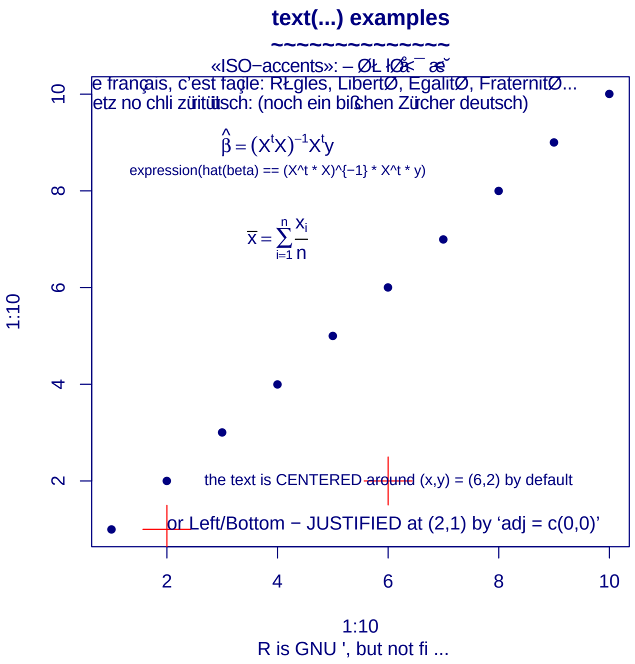
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- There was no example `grid` code that tested mathematical annotation
- Not enough just to have testing tools; must use them too!

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Summary

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- R has reasonably good QA and is getting better QC tools for graphics
- Programmers still need to create appropriate tests for the QC tools and QA process to be of any use

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