

Math environment inside \$\$

Kenji Sato

1 Matheamtical equation with bookdown::pdf_document2

You can cross-reference equations in Rmarkdown if you set output to `bookdown::pdf_document2` and write equations within `\begin{align} ~ \end{align}` or `\begin{equation} ~ \end{equation}`

An example:

$$f(x) = f(0) + \int_0^x f'(y)dy, \tag{1}$$

which we can cross-reference with a syntax different from LaTeX: Equation (1). See this [stackoverflow answer](#) by Yihui Xie and the related section of his bookdown book for more detail.

`\begin{equation*} ~ \end{equation*}` also produces an equation without number:

$$a^n + b^n = c^n$$

2 Drawback

A drawback of using `\begin{align} ~ \end{align}` or the like is that RStudio doesn't support math preview for them (yet). You must embrace the whole math environment with `$$`. (Figure 1)

The former however causes the “Bad mathe delimiter” error in the process of tex compilation.

3 Workaround

Step 1

Put the following code snippet in `.Rprofile` file of the project.

```
.beginMath = c(  
  "\\begin{equation}",  
  "\\begin{equation*}",  
  "\\begin{align}",  
  "\\begin{align*}"  
)  
  
.endMath = c(  
  "\\end{equation}",  
  "\\end{equation*}",  
  "\\end{align}",  
  "\\end{align*}"  
)  
  
.render_for_tex = function(input, ...){  
  output_file = gsub("\\\\.R[r]md$", ".tex", input)
```

```
29
30 $$
31 \begin{equation*}
32 a^n + b^n = c^n
33 \end{equation*}
34 $$
```

$$a^n + b^n = c^n$$

```
35
36 \begin{equation*}
37 a^n + b^n = c^n
38 \end{equation*}
39
40
```

Figure 1: Math preview

```
lines = readLines(input, encoding = "UTF-8");

for (i in seq_along(lines)) {
  # Remove $$ before \begin{equation} or the like.
  if (stringr::str_trim(lines[i]) == "$$") {
    if (any(startsWith(lines[i + 1], .beginMath))) {
      lines[i] = ""
    } else if (any(endsWith(lines[i - 1], .endMath))) {
      lines[i] = ""
    }
  }
}
writeLines(lines, "temp.Rmd"); on.exit(unlink('temp.Rmd'))
rmarkdown::render("temp.Rmd", output_file = output_file)
}
```

Step 2

Add `knit: .render_for_math` to the YAML frontmatter of your Rmd file. Then the Knit button of RStudio is overwritten with the custom renderer with preprocessing defined in `.Rprofile`.