Letters

Does not suffice to run `latex` a finite number of times to get cross-references right

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Abstract. We present a LaTeX file such that a cross-reference is wrong no matter how many times we run `latex`.

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It is well-known that we need to run `latex` several times to get cross-references right. This raises a natural question for mathematicians: for any LaTeX file, does it suffice to run `latex` a finite number of times? We show that the answer is negative, by a counterexample. The LaTeX file

```
\documentclass{article}
\usepackage{forloop}
\begin{document}
 \newcounter{n}
 \forloop{n}{0}
          {\value{n} < \pageref{l}}{~\newpage}
 Last-page label here\label{l}.
 Label value: \pageref{l}.
\end{document}
```

is such that the cross-reference `\pageref{l}` is wrong no matter how many times we run `latex`. This file uses a little diabolical trick: a label `l` is created in the last page (line 7) and there are created (resorting to a for loop) `\pageref{l}` many new pages (lines 5 and 6), causing the document to have `\pageref{l}` + 1 pages, so the cross-reference `\pageref{l}` to the last page is wrong. (An even more diabolical counterexample that avoids a for loop is shown at `http://tex.stackexchange.com/questions/30674`.)

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