{Simpler-Wick}

Simpler Wick Contractions

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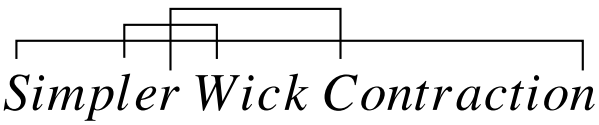

\(\wick{\c1Simp\c2le\c3r\ \c2Wick\ \c3Contractio\c1n}\)

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1 Introduction

This package provides simple way of inserting Wick contractions.

If you have any suggestions or have found any bugs, please feel free to create a new issue or pull request on the Github page: `https://www.github.com/JP-Ellis/simpler-wick`.

1.1 Installation

In order to use this as it is, simply download `simpler-wick.sty` and place it in the same directory as your TEX file and include it using the usual `\usepackage{simpler-wick}`. Alternatively, it is also possible to install `simpler-wick` system-wide by placing it inside TEX's search path (which will vary based on your operating system). This package is also available through CTAN.

2 Usage

The package is imported by adding `\usepackage{simpler-wick}` to your preamble. In your math environment, you can now use the `\wick` command in combination with `\c`:

```
\begin{equation}
  \wick{\c\phi A \c\phi}
\end{equation}
```

$$\overbrace{\phi A \phi}$$

If you wish to have multiple contractions, then follow `\c` with a number between 1 and 9; the first occurrence of `\cN` will start the Wick contraction, and the second occurrence of `\cN` will end it. After you have ended a contraction, `\cN` start another contraction.

```
\begin{equation}
  \wick{
    \c1 a \c2 b \c3 c \c1 a \c4 d \c1 e
    \c1 e \c1 a \c2 b \c3 c \c1 a
  }
\end{equation}
```

$$\overbrace{a\overbrace{b\overbrace{c\overbrace{a\overbrace{d\overbrace{e\overbrace{e\overbrace{a\overbrace{b\overbrace{c\overbrace{a}}}}}}}}}}}$$

The package has three options: `line width`, `sep` and `offset`. `line width` determines the thickness of the contraction lines; `sep` is the distance separating each level; and `offset` is the base offset. By default, `linewidth=0.4pt`, `sep=3pt` and `offset=1em`, but they can be changed globally by specifying them as package variables:

```
\usepackage[sep=5pt, offset=1.5em, line width=1pt]{simpler-wick}
```

Or you can specify them as optional argument to `\wick`. This is particularly useful if you have some tall symbols within your Wick contraction.

3 Examples

```
\begin{equation}
  \wick[offset=2em]{\c\phi \int \frac{dx}{x} \c\phi}
\end{equation}
```

$$\phi \int \frac{dx}{x} \phi$$

```
\begin{equation}
  \wick[line width=1.5pt]{\c\phi A \c\phi}
\end{equation}
```

$$\phi A \phi$$

Wick contractions can also work in exponents (or on equations for example), but requires that the

```
\begin{equation}
  \wick{a^{\c x y \c x}}
\end{equation}
```

$$a^{xyx}$$

```
\begin{equation}
  \wick{\frac{\c x}{y} \times \frac{\c a}{b}}
\end{equation}
```

$$\frac{x}{y} \times \frac{a}{b}$$