

Effect of the proximity to the $0^\circ/90^\circ$ interface on Energy Release Rate of fiber/matrix interface crack growth in the 90° -ply of a cross-ply laminate under tensile loading

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SAGE

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Abstract

Models of Representative Volume Elements (RVEs) of cross-ply laminates with different geometric configurations and damage states are studied. Debond growth is characterized by the estimation of the Mode I and Mode II Energy Release Rate (ERR) using the Virtual Crack Closure Technique (VCCT). It is found that the presence of the $0^\circ/90^\circ$ interface and the thickness of the 0° layer have no effect, apart from laminates with *ultra-thin* 90° plies where it is however modest. The present analysis support the claim that debond growth is not affected by the ply-thickness effect.

Keywords

Polymer-matrix Composites (PMCs), Fibre/matrix bond, Debonding, Finite Element Analysis (FEA)

Introduction

Many authors submitting to research journals use \LaTeX 2_ϵ to prepare their papers. This paper describes the `sagej.cls` class file which can be used to convert articles produced with other \LaTeX 2_ϵ class files into the correct form for submission to *SAGE Publications*.

The `sagej.cls` class file preserves much of the standard \LaTeX 2_ϵ interface so that any document which was produced using the standard \LaTeX 2_ϵ article style can easily be converted to work with the `sagej` style. However, the width of text and typesize will vary from that of `article.cls`; therefore, *line breaks will change* and it is likely that displayed mathematics and tabular material will need re-setting.

In the following sections we describe how to lay out your code to use `sagej.cls` to reproduce much of the typographical look of the *SAGE* journal that you wish to submit to. However, this paper is not a guide to using \LaTeX 2_ϵ and we would refer you to any of the many books available (see, for example, [Kopka and Daly \(2003\)](#), [Lamport \(1994\)](#) and [Mittelbach and Goossens \(2004\)](#)).

The three golden rules

Before we proceed, we would like to stress *three golden rules* that need to be followed to enable the most efficient use of your code at the typesetting stage:

- (i) keep your own macros to an absolute minimum;
- (ii) as \TeX is designed to make sensible spacing decisions by itself, do *not* use explicit horizontal or vertical spacing commands, except in a few accepted (mostly mathematical) situations, such as `\,` before a differential `d`, or `\quad` to separate an equation from its qualifier;

(iii) follow the journal reference style.

Getting started

The `sagej` class file should run on any standard \LaTeX 2_ϵ installation. If any of the fonts, style files or packages it requires are missing from your installation, they can be found on the *TeX Collection* DVDs or downloaded from CTAN.

The article header information

The heading for any file using `sagej.cls` is shown in Figure 1. You must select options for the trim/text area and the reference style of the journal you are submitting to. The choice of options are listed in Table 1.

For example, if your journal is short A4 sized, uses Times fonts and has Harvard style references then you would need `\documentclass[ShortAfour,times,sageh]{sagej}`

Most *SAGE* journals are published using Times fonts but if for any reason you have a problem using Times you can easily resort to Computer Modern fonts by removing the `times` option.

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```
\documentclass[<options>]{sagej}

\begin{document}

\runninghead{<Author surnames>}

\title{<Initial capital only>}

\author{<An Author\affilnum{1},
Someone Else\affilnum{2} and
Perhaps Another\affilnum{1}>}

\affiliation{<\affilnum{1}First and third authors' affiliation\\
\affilnum{2}Second author affiliation>}

\corrauth{<Corresponding author's name and full postal address>}

\email{<Corresponding author's email address>}

\begin{abstract}
<Text>
\end{abstract}

\keywords{<List keywords>}

\maketitle

\section{Introduction}
.
.
.
```

Figure 1. Example header text.

Table 1. The choice of options.

Option	Trim and font size	Columns
shortAfour	210 × 280 mm, 10pt	Double column
Afour	210 × 297 mm, 10pt	Double column
MCfour	189 × 246 mm, 10pt	Double column
PCfour	170 × 242 mm, 10pt	Double column
Royal	156 × 234 mm, 10pt	Single column
Crown	7.25 × 9.5 in, 10pt	Single column
Review	156 × 234 mm, 12pt	Single column

Option	Reference style
sageh	SAGE Harvard style (author-year)
sagev	SAGE Vancouver style (superscript numbers)
sageapa	APA style (author-year)

Remarks

- (i) In \runninghead use ‘et al.’ if there are three or more authors.
- (ii) For multiple author papers please note the use of \affilnum to link names and affiliations. The corresponding author details need to be included using the \corrauth and \email commands.
- (iii) For submitting a double-spaced manuscript, add doublespace as an option to the documentclass line.
- (iv) The abstract should be capable of standing by itself, in the absence of the body of the article and of the bibliography. Therefore, it must not contain any reference citations.
- (v) Keywords are separated by commas.
- (vi) If you are submitting to a SAGE journal that requires numbered sections (for example, IJRR), please add the command \setcounter{secnumdepth}{3} just above the \begin{document} line.

‘Review’ option

Some journals (for example, *Journal of the Society for Clinical Trials*) require that papers are set single column and with a larger font size to help with the review process. If this is a requirement for the journal that you are submitting to, just add the Review option to the \documentclass[]{sagej} line.

The body of the article

Mathematics

sagej.cls makes the full functionality of $\mathcal{A}\mathcal{M}\mathcal{T}\mathcal{E}\mathcal{X}$ available. We encourage the use of the align, gather and multiline environments for displayed mathematics.

```

\begin{table}
\small\sf\centering
\caption{<Table caption.>}
\begin{tabular}{<table alignment>}
\toprule
<column headings>\\\
\midrule
<table entries
(separated by & as usual)>\\
<table entries>\\
.
.
.\\\
\bottomrule
\end{tabular}
\end{table}

```

Figure 2. Example table layout.

`amsthm` is used for setting theorem-like and proof environments. The usual `\newtheorem` command needs to be used to set up the environments for your particular document.

Figures and tables

`sagej.cls` includes the `graphicx` package for handling figures.

Figures are called in as follows:

```

\begin{figure}
\centering
\includegraphics{<figure name>}
\caption{<Figure caption>}
\end{figure}

```

For further details on how to size figures, etc., with the `graphicx` package see, for example, [Kopka and Daly \(2003\)](#) or [Mittelbach and Goossens \(2004\)](#).

The standard coding for a table is shown in Figure 2.

Cross-referencing

The use of the \LaTeX cross-reference system for figures, tables, equations, etc., is encouraged (using `\ref{<name>}` and `\label{<name>}`).

End of paper special sections

Depending on the requirements of the journal that you are submitting to, there are macros defined to typeset various special sections.

The commands available are:

```

\begin{acks}
To typeset an
"Acknowledgements" section.
\end{acks}

\begin{biog}
To typeset an
"Author biography" section.
\end{biog}

```

```

\begin{biogs}
To typeset an
"Author Biographies" section.
\end{biogs}

\begin{dci}
To typeset a "Declaration of
conflicting interests" section.
\end{dci}

\begin{funding}
To typeset a "Funding" section.
\end{funding}

\begin{sm}
To typeset a
"Supplemental material" section.
\end{sm}

```

Endnotes

Most *SAGE* journals use endnotes rather than footnotes, so any notes should be coded as `\endnote{<Text>}`. Place the command `\theendnotes` just above the Reference section to typeset the endnotes.

To avoid any confusion for papers that use Vancouver style references, footnotes/endnotes should be edited into the text.

References

Please note that the files `SageH.bst` and `SageV.bst` are included with the class file for those authors using \LaTeX . The files work in a completely standard way, and you just need to uncomment one of the lines in the below example depending on what style you require:

```

%%Harvard (name/date)
%\bibliographystyle{SageH}
%%Vancouver (numbered)
%\bibliographystyle{SageV}
\bibliography{<YourBibfile.bib>}

```

and remember to add the relevant option to the `\documentclass[] {sagej}` line as listed in Table 1.

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Website: <http://www.sunrise-setting.co.uk>

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