

학술지 클래스 만들기

서강대학교 수학과
권현우

2016 KTUG Conference

- 1 MS Word이 버전업 되면서 기존에 사용하던 Equation 3.0과의 호환 문제가 생김
- 2 버전이 업그레이드 되면 될 수록 차후에 문제들을 감당하기 어려울 것이라 짐작
- 3 유럽권에서 \LaTeX 에 대한 요청을 했는데, 이에 대해서 수용하기로 하면서 클래스 제작을하기로 함.

제작사항

- 저자 배포용 + 견본파일
- 저널 규격에 맞게 설정(첫 페이지, 섹션 등등)
- 다기능 저자 입력
- affiliation 기능 추가
- 해당 학회에서 사용하는 인용방식 기능 추가
- 해당 학회에서 사용하는 그림, 표 양식에 맞게 제작

제약조건

- 1 expl3와 같은 L^AT_EX3 코드를 사용하는 것을 지양한다.
- 2 워드로 만들어진 기존의 학술지 논문과 최대한 어색하지 않도록 만든다.

Stochastic elastic wave analysis of angled beams

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¹State Key Laboratory of Mechanical Structure Strength and Vibration/ School of Aerospace, Xi'an Jiaotong University, Xi'an 710049, China

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(Received January 12, 2013; Revised October 2, 2015; Accepted November 6, 2015)

Abstract. The stochastic finite element method is employed to obtain a stochastic dynamic model of angled beams subjected to impact loads when uncertain material properties are described by random fields. Using the perturbation technique in conjunction with a precise time integration method, a random analysis approach is developed for efficient analysis of random elastic waves. Formulas for the mean, variance and covariance of displacement, strain and stress are introduced. Statistics of displacement and stress waves is analyzed and effects of bend angle and material stochasticity on wave propagation are studied. It is found that the elastic wave correlation in the angled section is the most significant. The mean, variance and covariance of the stress wave amplitude decrease with an increase in bend angle. The standard deviation of the beam material density plays an important role in longitudinal displacement wave covariance.

Keywords: elastic wave; stochastic finite element; angled beam; impact; random parameter; uncertainty

1. Introduction

In many engineering problems, the material properties of structures may vary with spatial coordinates and should thus be modeled as spatial random fields. Random material properties are of considerable importance in actual structural analysis, as they cause structural dynamic responses to behave in a random manner.

The so-called stochastic finite element method (SFE), as a numerical method for stochastic structural analysis, has been extensively developed with different approaches (Countertras 1980, Yamazaki *et al.* 1985, Benaroya and Rehak 1988, Elishakoff *et al.* 1997, Gupta and Manohar 2002). In the last decade, many researchers have contributed to the field of stochastic dynamic analysis, such as the researches on vibration and reliability of stochastic rotating beams (Hosseini and Khadem 2007), response analysis of stochastic structural systems (Papadopoulos *et al.* 2006), eigenvalue problem of stochastic structures (Ishida 2001), and so on (Nouy and Clement 2010, Hosseini and Shahabian 2014, Abd-Alla *et al.* 2015). In SFE, there are many methods, such as midpoint, interpolation, local average method and weighted integral method, to discretize

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Abstract. The stochastic finite element method is employed to obtain a stochastic dynamic model of angled beams subjected to impact loads when uncertain material properties are described by random fields. Using the perturbation technique in conjunction with a precise time integration method, a random analysis approach is developed for efficient analysis of random elastic waves. Formulas for the mean, variance and covariance of displacement, strain and stress are introduced. Statistics of displacement and stress waves is analyzed and effects of bend angle and material stochasticity on wave propagation are studied. It is found that the elastic wave correlation in the angled section is the most significant. The mean, variance and covariance of the stress wave amplitude decrease with an increase in bend angle. The standard deviation of the beam material density plays an important role in longitudinal displacement wave covariance.

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1. Introduction

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1. Introduction

Section title - Level 1:
Arial, 11pt, Bold, No indent

2.1 *Numerical simulation procedure*

Subtitle - Level 2:
Arial, 11pt, *Italic*, 0.5cm indent

- section은 11pt, Times New Roman
- subsection, subsection은 11pt, *itshape*, *sffamily*
- section같은 경우는 section 앞에 2행 비우기, 뒤에 1행 비우기

titlesec 패키지를 이용

```
\titleformat{\section}[hang]{\sffamily\normalsize\bfseries}{\thechapter. #1}
\titleformat{\subsection}[hang]{\sffamily\normalsize\itshape}{\thechapter}
{\indent\thesubsection\enspace #1}
\titleformat{\subsubsection}[hang]{\sffamily\normalsize\itshape}{\thechapter}
{\indent\thesubsubsection\enspace #1}
\titleformat{\subsubsubsection}[hang]{\sffamily\normalsize\itshape}{\thechapter}
{\indent\thesubsubsubsection\enspace #1}}
```

```
\titleformat{name=\section,numberless}[hang]
{\sffamily\normalsize\bfseries}{\thechapter}{#1}
\titleformat{name=\subsection,numberless}[hang]
{\sffamily\normalsize\itshape}{\thechapter}{\indent #1}
\titleformat{name=\subsubsection,numberless}[hang]
{\sffamily\normalsize\itshape}{\thechapter}{\indent #1}
\titleformat{name=\subsubsubsection,numberless}[hang]
{\sffamily\normalsize\itshape}{\thechapter}{\indent#1}
```

titlesec 패키지를 이용

```
\titlespacing*{\section} {0em}{16pt}{8pt}  
\titlespacing*{\subsection} {1.2em}{8pt}{8pt}  
\titlespacing*{\subsubsection} {1.2em}{8pt}{0ex}  
\titlespacing*{\subsubsubsection} {1.2em}{8pt}{0ex}
```

XeLaTeX일 경우 parindent같은 요소를 조정

Structural Engineering and Mechanics, Vol. 56, No. 5 (2015) 767-785
DOI: <http://dx.doi.org/10.12989/sem.2015.56.5.767>

767

- 첫 화면에 저널제목, volume 정보, issue 정보, DOI 정보, copyright 정보 입력
- 매 페이지에 상단에 논문제목, 상단 면주의 저자정보 입력

fancyhdr, lastpage 패키지 이용

```
\fancypagestyle{frontpage}{  
  \fancyhf{} %  
  \fancyhead[LO]{\journalinfo, \newline {\showdoi}}  
  \fancyhead[RO]{\small\thepage}  
  \fancyfoot[LO]{\sffamily\fontsize{9pt}{9pt}\selectfont  
  \textbf{Copyright \textcopyright{} \@journalyear{} Techno-Press. Ltd.}\newline\urlstyle{sf}  
  \url{\@copyrightaddress}\urlstyle{rm}\hfill \sffamily\fontsize{9pt}{9pt}\selectfont  
  ISSN: \@copyrightprint (Print), \@copyrightonline (Online)}  
  \renewcommand{\headrulewidth}{0pt}  
  \fancyheadoffset{1pt}  
}
```

fancyhdr, lastpage 패키지 이용

```
\fancypagestyle{journalstyle}{  
\fancyhf{}  
\fancyhead[LE]{\small\thepage}  
\fancyhead[CE]{\small\itshape\leftmark}  
\renewcommand{\headrulewidth}{0pt}  
\fancyhead[RO]{\small\thepage}  
\fancyhead[CO]{\small\itshape\rightmark}  
\fancyheadoffset{1pt}  
}
```

- 표의 캡션은 표의 위에 만들고, 그림의 캡션은 그림 아래.
- Figure의 figure name은 Fig., Table의 table name은 Table으로
- Fig., Table을 indent

```
\RequirePackage{float}
```

```
\floatstyle{plaintop}
```

```
\restylefloat{table}
```

```
\RequirePackage{caption}
```

```
\captionsetup[figure]{labelsep=space,font=small,format=hang}
```

```
\captionsetup[table]{position=top,singlelinecheck=false,  
labelsep=space,font=small,aboveskip=0pt,format=hang}
```

changes 패키지

에디터 버전에는 간단한 option 기능을 추가하여, 교정된 것과 교정이 끝난 것 구분을 한꺼번에 하는 설정을 완성

```
\usepackage{changes}
\definechangesauthor[color=blue]{AU}
\definechangesauthor[color=red,name={A.U.Thor}]{ID}
```

...

Any revisions `\replaced[id=AU]{could}{should}` be `\deleted[id=AU]{clearly}` highlighted, for example using the ```Track Changes''` function in Microsoft Word `\added[id=ID]{program}`, so that changes are easily visible to the editors and reviewers.

Any revisions `couldshouldAU` be `clearlyAU` highlighted, for example using the “Track Changes” function in Microsoft Word `programID`, so that changes are easily visible to the editors and reviewers.

- 약물 사이의 간격을 줄인다.
- 패키지를 사용하지 않는다 (예: enumitem, enumerate 패키지 사용 x)

```
\let\tempone\itemize
\let\temptwo\enditemize
\let\tempthree\enumerate
\let\tempfour\endenumerate
```

```
\renewenvironment{itemize}{\tempone\setlength{\itemsep}{1pt}}{\temptwo}
\renewenvironment{enumerate}{\tempthree\setlength{\itemsep}{1pt}}
{\tempfour}
```

Put the title of the paper here length up to 2 lines

First Author^{2a}, Second Author*¹ and Third Author^{2b}

¹*Affiliation (Department, Institute, Address, Country)*

²*Department of Civil Engineering, Korean Advanced Institute for Science and Technology, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, Republic of Korea*

(Received keep as blank, Revised keep as blank, Accepted keep as blank)

- 각주 (이메일 정보 각주, 교신저자, sans체)
- 소속 정보 (superscript 정보 기록)
- 저자 정보 (연락처, 소속 정보 읽기, 저자수 카운팅)

Put the title of the paper here length up to 2 lines

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²*Department of Civil Engineering, Korean Advanced Institute for Science and Technology, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, Republic of Korea*

(Received keep as blank, Revised keep as blank, Accepted keep as blank)

* 저자의 이메일 주소와 같은 정보에는 알파벳으로 각주만들기

```
\renewcommand{\thanks}[1]{\renewcommand{\thefootnote}{\alph{footnote}}\footnote{#1}}
```


Put the title of the paper here length up to 2 lines

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(Received keep as blank, Revised keep as blank, Accepted keep as blank)

* 교신저자 정보

```
\correspinfo[Professor (or Ph.D.,etc)]{email address}
```

```
\newcommand{\correspinfo}[2][\empty]{\ifx#1\def\@correspemail{#2}\else%
```

```
\def\@corresp{#1}%
```

```
\def\@correspemail{#2}\fi}
```

```
\newcommand{\corresp}{\raise0.14ex\hbox{\sffamily\fontsize{11pt}{11pt}\selectfont*}}
```

Put the title of the paper here length up to 2 lines

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(Received keep as blank, Revised keep as blank, Accepted keep as blank)

* title 정보에 footnotemark는 sans체로

```
\def\@makefnmark{\raise0.7ex\hbox{\scriptsize\sffamily{\@thefnmark}\m@th}}
```

```
\def\@mymakefnmark{\hbox{$^\@thefnmark}\m@th$}}
```

```
\renewcommand\@makefntext[1]{%
```

```
\noindent\@mymakefnmark #1}
```

Put the title of the paper here length up to 2 lines

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```
\affiliation[a1]{Affiliation (Department, Institute, Address, Country)}
```

해결해야 할 요소

- 어떻게 소속번호에 라벨링을 줄 수 있을 것인가?
- hyperref와의 충돌 없이 라벨링을 불러올 수 있는 방법이 무엇인가?
- 최종적으로 첫 페이지에 소속들을 잘 나열하기 위해서는 어떻게 해야 할 것인가?

```
\RequirePackage[breaklinks=true]{hyperref}
\RequirePackage{refcount}

\protected\def\setaffilfont{\sffamily\itshape\fontsize{7pt}{7pt}\selectfont}
\newcommand{\affiliation}[2][\empty]{\refstepcounter{affil}%
  \ifx#1\empty
    \xdef\affilinfo{\affilinfo #2\noexpand\par}%
  \else
    \label{author:#1}%
    \xdef\affilinfo{\affilinfo
      \mbox{\setaffilfont\raise1ex\hbox{\theaffil}}#2\noexpand\par}%
  \fi
}
```

Put the title of the paper here length up to 2 lines

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(Received keep as blank, Revised keep as blank, Accepted keep as blank)

```
\author[a2]{First Author}{\thanks{Ph.D., E-mail: \email{email address}}}
```

```
\author[a1]{Second Author\corresp}{}
```

```
\author[a2]{Third Author}{\thanks{Ph.D., E-mail: \email{email address}}}
```

- 저자의 소속을 불러오는 방법
- 교신저자 표시의 문제
- 저자 수에 따른 생성방법

```
\newcommand{\setrefauthor}[1]{\getrefnumber{author:#1}}
```

```
\newcommand\printauthornumber[1]{%
```

```
\let\@tempb\z@
```

```
\@for\@tempa:=#1\do{%
```

```
\ifx\@tempb\@ne,\fi
```

```
\setrefauthor\@tempa
```

```
\let\@tempb\@ne
```

```
}%
```

```
}
```

```
\renewcommand\author[3][\empty]{%  
  \ifx#1\empty%  
    \g@addto@macro\@authors{{#2}}%  
  \else  
    \g@addto@macro\@authors{{#2\textsuperscript{\printauthornumber{#1}}#3}}%  
  \fi  
}
```

교신저자 정보는 무조건 첫 번째 각주로 입력이 되어야 한다.

```
\newcommand\blfootnote[1]{%  
  \begingroup  
  \renewcommand\thefootnote{\footnote{\hspace{-1pt}{\raise-0.1ex\hbox{*}}#1}%  
  \addtocounter{footnote}{-1}%  
  \endgroup  
}
```

```
\ifx\@corresp\empty  
  \blfootnote{Corresponding author, E-mail: \email{\@correspemail}}  
  \else  
  \blfootnote{Corresponding author, \@corresp ,E-mail: \email{\@correspemail}}  
  \fi
```

```
\newcommand{\correspinfo}[2][\empty]{\ifx#1\def\@correspemail{#2}\else%  
\def\@corresp{#1}%  
\def\@correspemail{#2}\fi}
```


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(Received keep as blank, Revised keep as blank, Accepted keep as blank)

- 저자가 1명이면 (John Smith)
- 저자가 2명이면 (John Smith and Rose Tyler)
- 저자가 3명이상이면 (John Smith, Rose Tyler and Amy Pond)

```
\newcommand\printauthor{%  
  \let\next\relax  
  \expandafter\print@author\@authors\@nil\relax\relax  
}
```

```
\newcommand\print@author[3]{%
  \ifx\nil#1%
    \let\next\relax
  \else
    \ifx\nil#2%
      #1%
      \let\next\relax
    \else
      \ifx\nil#3%
        #1\ifx\next\relax\else\fi\ and #2%
        \let\next\relax
      \else
        #1, %
        \def\next{\print@author{#2}{#3}}%
      \fi
    \fi
  \fi
\next
}
```

- $\text{T}_\text{E}\text{X}$ 의 기본옵션이 아닌 APA 스타일처럼 (정확히는 아님)
- bib 파일이 입수되었을 때, bib 파일을 효율적으로 처리

해결: natbib author-year option

```
\RequirePackage{natbib}
\setcitestyle{citesep={,},aysep={},yysep={, }}

\def\bibfont{\small}
\setlength{\bibsep}{3pt}
```

해결 : natbib author-year option

```
\bibitem[\protect\citeauthoryear{Cheng}{2012}]{key-1} Cheng, Y.F. (2012),  
``{A comparison of large....}'', \textit{Journal of  
Wind Engineering}, \textbf{91}(4), 1301--1328.
```

```
\bibitem[\protect\citeauthoryear{Cheng and Xu}{2012a}]{key-2}  
Cheng, Y.F. and Xu, B.M. (2012a), ``{A comparison of  
large....}'', \textit{Journal of Wind Engineering}, \textbf{91}(4), 1301--1328.
```

```
\bibitem[\protect\citeauthoryear{Cheng and Xu}{2012b}]{key-4}  
Cheng, Y.F. and Xu, B.M. (2012b), ``{A comparison of  
large....}'', \textit{Journal of Wind Engineering}, \textbf{91}(4), 1301--1328.
```

```
\bibitem[\protect\citeauthoryear{Cheng \textit{et al.}}{2012}]{key-3}  
Cheng, Y.F., Xu, B.M. and Carter, G.D. (2012), ``{A comparison of  
large....}'', \textit{Journal of Wind Engineering}, \textbf{91}(4), 1301--1328.
```

- 직접적으로 bst 파일을 설계하는 것은 매우 어렵다.
- makebst + merlin 조합으로 80% 해결 가능
- 나머지는 직접적으로 코드 수정

Thank you