

Autonomous Robots

Disambiguation of Human Intent Through Control Space Selection

--Manuscript Draft--

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Abstract:	<p>Assistive shared-control robots have the potential to transform the lives of millions of people afflicted with severe motor impairments as a result of spinal cord or brain injuries. The effectiveness and usefulness of shared-control robots is closely related to their ability to infer the user's needs and intentions and is often a limiting factor for providing appropriate assistance quickly, confidently and accurately. The contributions of this paper are three-fold: first, we propose a goal disambiguation algorithm which enhances the intent inference and assistive capabilities of a shared-control assistive robotic arm. Second, we introduce a novel intent inference algorithm that works in conjunction with the disambiguation scheme, inspired by dynamic field theory in which the time evolution of the probability distribution over goals is specified as a dynamical system. Third, we present a pilot human subject study to evaluate the efficacy of the disambiguation system. This study was performed with eight subjects. Our results suggest that (a) the disambiguation system has a greater utility value as the control interface becomes more limited and the task becomes more complex, (b) subjects demonstrated a diverse range of disambiguation request behavior with a greater concentration in the earlier parts of the trial and (c) there are no differences in the onset of robot assistance between different mode switching paradigms across tasks or across interfaces.</p>	
Response to Reviewers:	Please see attached pdf file containing detailed response to all the reviewers' concerns as well as version of the revised article with all major/relevant changes marked in blue.	

[Click here to view linked References](#)

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3
4 This is pdfTeX, Version 3.14159265-2.6-1.40.16 (TeX Live 2015/W32TeX)
5 (preloaded format=pdflatex 2016.4.6)  4 MAY 2018 22:43
6 entering extended mode
7   restricted \writel8 enabled.
8   %&-line parsing enabled.
9 **./gopinathargallauro2017.tex
10 (./gopinathargallauro2017.tex
11 LaTeX2e <2016/03/31>
12 Babel <3.9q> and hyphenation patterns for 81 language(s) loaded.
13 (c:/TeXLive/2015/texmf-dist/tex/latex/base/fix-cm.sty
14 Package: fix-cm 2015/01/14 v1.1t fixes to LaTeX
15 (c:/TeXLive/2015/texmf-dist/tex/latex/base/tslenc.def
16 File: tslenc.def 2001/06/05 v3.0e (jk/car/fm) Standard LaTeX file
17 )) (c:/TeXLive/texmf-local/tex/latex/aries/svjour3.cls
18 Document Class: svjour3 2007/05/08 v3.2
19 LaTeX document class for Springer journals
20 (c:/TeXLive/2015/texmf-dist/tex/latex/base/fleqn.clo
21 File: fleqn.clo 2015/03/31 v1.1i Standard LaTeX option (flush left
22 equations)
23 \mathindent=\dimen102
24 Applying: [2015/01/01] Make \[ robust on input line 50.
25 LaTeX Info: Redefining \[ on input line 51.
26 Already applied: [0000/00/00] Make \[ robust on input line 62.
27 Applying: [2015/01/01] Make \] robust on input line 74.
28 LaTeX Info: Redefining \] on input line 75.
29 Already applied: [0000/00/00] Make \] robust on input line 83.
30 )
31 Class Springer-SVJour3 Info: extra/valid Springer sub-package (-> *.clo)
32 (Springer-SVJour3) not found in option list of \documentclass
33 (Springer-SVJour3) - autoactivating "global" style.
34 (c:/TeXLive/texmf-local/tex/latex/aries/svglov3.clo
35 File: svglov3.clo 2009/12/18 v3.2 style option for standardised journals
36 SVJour Class option: svglov3.clo for standardised journals
37 )
38 LaTeX Font Info: Redefining math symbol \Gamma on input line 147.
39 LaTeX Font Info: Redefining math symbol \Delta on input line 148.
40 LaTeX Font Info: Redefining math symbol \Theta on input line 149.
41 LaTeX Font Info: Redefining math symbol \Lambda on input line 150.
42 LaTeX Font Info: Redefining math symbol \Xi on input line 151.
43 LaTeX Font Info: Redefining math symbol \Pi on input line 152.
44 LaTeX Font Info: Redefining math symbol \Sigma on input line 153.
45 LaTeX Font Info: Redefining math symbol \Upsilon on input line 154.
46 LaTeX Font Info: Redefining math symbol \Phi on input line 155.
47 LaTeX Font Info: Redefining math symbol \Psi on input line 156.
48 LaTeX Font Info: Redefining math symbol \Omega on input line 157.
49 \logodepth=\dimen103
50 \headerboxheight=\dimen104
51 \betweenumberspace=\dimen105
52 \aftertext=\dimen106
53 \headlineindent=\dimen107
54 \c@inst=\count79
55 \c@auth=\count80
56 \instindent=\dimen108
57 \authrun=\box26
```

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1
2
3
4 \authorrunning=\toks14
5 \titrun=\box27
6 \titlerunning=\toks15
7 \combirun=\box28
8 \c@lastpage=\count81
9 \rubricwidth=\dimen109
10 \c@section=\count82
11 \c@subsection=\count83
12 \c@subsubsection=\count84
13 \c@paragraph=\count85
14 \c@subparagraph=\count86
15 \spthmsep=\dimen110
16 \c@theorem=\count87
17 \c@case=\count88
18 \c@conjecture=\count89
19 \c@corollary=\count90
20 \c@definition=\count91
21 \c@example=\count92
22 \c@exercise=\count93
23 \c@lemma=\count94
24 \c@note=\count95
25 \c@problem=\count96
26 \c@property=\count97
27 \c@proposition=\count98
28 \c@question=\count99
29 \c@solution=\count100
30 \c@remark=\count101
31 \c@figure=\count102
32 \c@table=\count103
33 \abovecaptionskip=\skip41
34 \belowcaptionskip=\skip42
35 \figcapgap=\dimen111
36 \tabcapgap=\dimen112
37 \figgap=\dimen113
38 \bibindent=\dimen114
39 \@tempcntc=\count104
40 ) (c:/TeXLive/2015/texmf-dist/tex/latex/natbib/natbib.sty
41 Package: natbib 2010/09/13 8.31b (PWD, AO)
42 \bibhang=\skip43
43 \bibsep=\skip44
44 LaTeX Info: Redefining \cite on input line 694.
45 \c@NAT@ctr=\count105
46 ) (c:/TeXLive/2015/texmf-dist/tex/latex/graphics/graphicx.sty
47 Package: graphicx 2014/10/28 v1.0g Enhanced LaTeX Graphics (DPC,SPQR)
48 (c:/TeXLive/2015/texmf-dist/tex/latex/graphics/keyval.sty
49 Package: keyval 2014/10/28 v1.15 key=value parser (DPC)
50 \KV@toks@=\toks16
51 ) (c:/TeXLive/2015/texmf-dist/tex/latex/graphics/graphics.sty
52 Package: graphics 2016/01/03 v1.0q Standard LaTeX Graphics (DPC,SPQR)
53 (c:/TeXLive/2015/texmf-dist/tex/latex/graphics/trig.sty
54 Package: trig 2016/01/03 v1.10 sin cos tan (DPC)
55 ) (c:/TeXLive/2015/texmf-dist/tex/latex/latexconfig/graphics.cfg
56 File: graphics.cfg 2010/04/23 v1.9 graphics configuration of TeX Live
57 )
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2
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4 Package graphics Info: Driver file: pdftex.def on input line 95.
5 (c:/TeXLive/2015/texmf-dist/tex/latex/pdftex-def/pdftex.def
6 File: pdftex.def 2011/05/27 v0.06d Graphics/color for pdfTeX
7 (c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/infwarerr.sty
8 Package: infwarerr 2010/04/08 v1.3 Providing info/warning/error messages
9 (HO)
10 ) (c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/ltxcmds.sty
11 Package: ltxcmds 2011/11/09 v1.22 LaTeX kernel commands for general use
12 (HO)
13 )
14 \Gread@gobject=\count106
15 ))
16 \Gin@req@height=\dimen115
17 \Gin@req@width=\dimen116
18 ) (c:/TeXLive/2015/texmf-dist/tex/latex/changes/changes.sty
19 Package: changes 2015/04/27 v2.0.4 changes package
20 *** changes package 2015/04/27 v2.0.4 ***
21 (c:/TeXLive/2015/texmf-dist/tex/latex/xkeyval/xkeyval.sty
22 Package: xkeyval 2014/12/03 v2.7a package option processing (HA)
23 (c:/TeXLive/2015/texmf-dist/tex/generic/xkeyval/xkeyval.tex
24 (c:/TeXLive/2015/te
25 xmf-dist/tex/generic/xkeyval/xkvutils.tex
26 \XKV@toks=\toks17
27 \XKV@tempa@toks=\toks18
28 )
29 \XKV@depth=\count107
30 File: xkeyval.tex 2014/12/03 v2.7a key=value parser (HA)
31 )) (c:/TeXLive/2015/texmf-dist/tex/latex/xifthen/xifthen.sty
32 Package: xifthen 2015/11/05 v1.4.0 Extended ifthen features
33 (c:/TeXLive/2015/texmf-dist/tex/latex/tools/calc.sty
34 Package: calc 2014/10/28 v4.3 Infix arithmetic (KKT,FJ)
35 \calc@Acount=\count108
36 \calc@Bcount=\count109
37 \calc@Adimen=\dimen117
38 \calc@Bdimen=\dimen118
39 \calc@Askip=\skip45
40 \calc@Bskip=\skip46
41 LaTeX Info: Redefining \setlength on input line 80.
42 LaTeX Info: Redefining \addtolength on input line 81.
43 \calc@Ccount=\count110
44 \calc@Cskip=\skip47
45 ) (c:/TeXLive/2015/texmf-dist/tex/latex/base/ifthen.sty
46 Package: ifthen 2014/09/29 v1.1c Standard LaTeX ifthen package (DPC)
47 ) (c:/TeXLive/2015/texmf-dist/tex/latex/ifmtarg/ifmtarg.sty
48 Package: ifmtarg 2009/09/02 v1.2a check for an empty argument
49 ))
50 changes-option 'final'
51 (c:/TeXLive/2015/texmf-dist/tex/latex/xcolor/xcolor.sty
52 Package: xcolor 2007/01/21 v2.11 LaTeX color extensions (UK)
53 (c:/TeXLive/2015/texmf-dist/tex/latex/latexconfig/color.cfg
54 File: color.cfg 2007/01/18 v1.5 color configuration of TeTeX/TeXLive
55 )
56 Package xcolor Info: Driver file: pdftex.def on input line 225.
57
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2
3
4 Package xcolor Info: Model `cmy' substituted by `cmy0' on input line
5 1337.
6 Package xcolor Info: Model `hsb' substituted by `rgb' on input line 1341.
7 Package xcolor Info: Model `RGB' extended on input line 1353.
8 Package xcolor Info: Model `HTML' substituted by `rgb' on input line
9 1355.
10 Package xcolor Info: Model `Hsb' substituted by `hsb' on input line 1356.
11 Package xcolor Info: Model `tHsb' substituted by `hsb' on input line
12 1357.
13 Package xcolor Info: Model `HSB' substituted by `hsb' on input line 1358.
14 Package xcolor Info: Model `Gray' substituted by `gray' on input line
15 1359.
16 Package xcolor Info: Model `wave' substituted by `hsb' on input line
17 1360.
18
19 ) (c:/TeXLive/2015/texmf-dist/tex/latex/oberdiek/pdfcolmk.sty
20 Package: pdfcolmk 2008/08/11 v1.2 Color support for pdfTeX via marks (HO)
21 Package pdfcolmk Info: The color stack of pdfTeX >= 1.40 is used.
22 Therefore
23 (pdfcolmk)                this package is not necessary and not loaded.
24 ) (c:/TeXLive/2015/texmf-dist/tex/generic/ulem/ulem.sty
25 \UL@box=\box29
26 \UL@hyphenbox=\box30
27 \UL@skip=\skip48
28 \UL@hook=\toks19
29 \UL@height=\dimen119
30 \UL@pe=\count111
31 \UL@pixel=\dimen120
32 \ULC@box=\box31
33 Package: ulem 2012/05/18
34 \ULdepth=\dimen121
35 )
36 \c@Changes@AuthorCount=\count112
37 \c@Changes@Author=\count113
38 \c@Changes@AddCount=\count114
39 \c@Changes@DeleteCount=\count115
40 \c@Changes@ReplaceCount=\count116
41 (c:/TeXLive/2015/texmf-dist/tex/latex/truncate/truncate.sty
42 Package: truncate 2001/08/20 ver 3.6
43 \@Trunc@RestHyph=\toks20
44 )
45 \Changes@Len@summ=\skip49
46 ) (c:/TeXLive/2015/texmf-dist/tex/latex/amsfonts/amssymb.sty
47 Package: amssymb 2013/01/14 v3.01 AMS font symbols
48 (c:/TeXLive/2015/texmf-dist/tex/latex/amsfonts/amsfonts.sty
49 Package: amsfonts 2013/01/14 v3.01 Basic AMSFonts support
50 \@emptytoks=\toks21
51 \symAMSa=\mathgroup4
52 \symAMSb=\mathgroup5
53 LaTeX Font Info: Overwriting math alphabet ``\mathfrak' in version
54 `bold'
55 (Font)                U/euf/m/n --> U/euf/b/n on input line 106.
56 )) (c:/TeXLive/2015/texmf-dist/tex/latex/amsmath/amsmath.sty
57 Package: amsmath 2016/03/10 v2.15b AMS math features
58 \@mathmargin=\skip50
59
60
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4 For additional information on amsmath, use the '?' option.
5 (c:/TeXLive/2015/texmf-dist/tex/latex/amsmath/amstext.sty
6 Package: amstext 2000/06/29 v2.01 AMS text
7 (c:/TeXLive/2015/texmf-dist/tex/latex/amsmath/amsgen.sty
8 File: amsgen.sty 1999/11/30 v2.0 generic functions
9 \@emptytoks=\toks22
10 \ex@=\dimen122
11 )) (c:/TeXLive/2015/texmf-dist/tex/latex/amsmath/amsbsy.sty
12 Package: amsbsy 1999/11/29 v1.2d Bold Symbols
13 \pmbraise@=\dimen123
14 ) (c:/TeXLive/2015/texmf-dist/tex/latex/amsmath/amsopn.sty
15 Package: amsopn 2016/03/08 v2.02 operator names
16 )
17 \inf@bad=\count117
18 LaTeX Info: Redefining \frac on input line 199.
19 \uproot@=\count118
20 \leftroot@=\count119
21 LaTeX Info: Redefining \overline on input line 297.
22 \classnum@=\count120
23 \DOTSCASE@=\count121
24 LaTeX Info: Redefining \ldots on input line 394.
25 LaTeX Info: Redefining \dots on input line 397.
26 LaTeX Info: Redefining \cdots on input line 518.
27 \Mathstrutbox@=\box32
28 \strutbox@=\box33
29 \big@size=\dimen124
30 LaTeX Font Info: Redefining font encoding OML on input line 634.
31 LaTeX Font Info: Redefining font encoding OMS on input line 635.
32
33
34 Package amsmath Warning: Unable to redefine math accent \vec.
35
36 \macc@depth=\count122
37 \c@MaxMatrixCols=\count123
38 \dotsspace@=\muskip10
39 \c@parentequation=\count124
40 \dspbrk@lvl=\count125
41 \tag@help=\toks23
42 \row@=\count126
43 \column@=\count127
44 \maxfields@=\count128
45 \andhelp@=\toks24
46 \eqnshift@=\dimen125
47 \alignsep@=\dimen126
48 \tagshift@=\dimen127
49 \tagwidth@=\dimen128
50 \totwidth@=\dimen129
51 \lineht@=\dimen130
52 \@envbody=\toks25
53 \multlinegap=\skip51
54 \multlinetaggap=\skip52
55 \mathdisplay@stack=\toks26
56 LaTeX Info: Redefining \[ on input line 2739.
57 LaTeX Info: Redefining \] on input line 2740.
58 ) (c:/TeXLive/2015/texmf-dist/tex/latex/base/latexsym.sty
59
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1
2
3
4 Package: latexsym 1998/08/17 v2.2e Standard LaTeX package (lasy symbols)
5 \symlasy=\mathgroup6
6 LaTeX Font Info: Overwriting symbol font `lasy' in version `bold'
7 (Font) U/lasy/m/n --> U/lasy/b/n on input line 52.
8 ) (c:/TeXLive/2015/texmf-dist/tex/latex/float/float.sty
9 Package: float 2001/11/08 v1.3d Float enhancements (AL)
10 \c@float@type=\count129
11 \float@exts=\toks27
12 \float@box=\box34
13 \@float@everytoks=\toks28
14 \@floatcapt=\box35
15 ) (c:/TeXLive/2015/texmf-dist/tex/latex/graphics/epsfig.sty
16 Package: epsfig 1999/02/16 v1.7a (e)psfig emulation (SPQR)
17 \epsfxsize=\dimen131
18 \epsfysize=\dimen132
19 ) (c:/TeXLive/texmf-local/tex/latex/aries/subfigure.sty
20 Package: subfigure 2002/03/15 v2.1.5 subfigure package
21 \subfigtopskip=\skip53
22 \subfigcapskip=\skip54
23 \subfigcaptopadj=\dimen133
24 \subfigbottomskip=\skip55
25 \subfigcapmargin=\dimen134
26 \subfiglabelskip=\skip56
27 \c@subfigure=\count130
28 \c@lofdepth=\count131
29 \c@subtable=\count132
30 \c@lotdepth=\count133
31 *****
32 * Local config file subfigure.cfg used *
33 *****
34 (c:/TeXLive/texmf-local/tex/latex/aries/subfigure.cfg)
35 \subfig@top=\skip57
36 \subfig@bottom=\skip58
37 ) (c:/TeXLive/2015/texmf-dist/tex/latex/mathtools/mathtools.sty
38 Package: mathtools 2015/11/12 v1.18 mathematical typesetting tools
39 (c:/TeXLive/2015/texmf-dist/tex/latex/mathtools/mhsetup.sty
40 Package: mhsetup 2010/01/21 v1.2a programming setup (MH)
41 )
42 LaTeX Info: Thecontrolsequence`\('isalreadyrobust on input line 129.
43 LaTeX Info: Thecontrolsequence`\)'isalreadyrobust on input line 129.
44 LaTeX Info: Thecontrolsequence`\['isalreadyrobust on input line 129.
45 LaTeX Info: Thecontrolsequence`\]'isalreadyrobust on input line 129.
46 \g_MT_multlinerow_int=\count134
47 \l_MT_multwidth_dim=\dimen135
48 \origjot=\skip59
49 \l_MT_shortvdotswithinadjustabove_dim=\dimen136
50 \l_MT_shortvdotswithinadjustbelow_dim=\dimen137
51 \l_MT_above_intertext_sep=\dimen138
52 \l_MT_below_intertext_sep=\dimen139
53 \l_MT_above_shortintertext_sep=\dimen140
54 \l_MT_below_shortintertext_sep=\dimen141
55 ) (c:/TeXLive/2015/texmf-dist/tex/latex/bbm-macros/bbm.sty
56 Package: bbm 1999/03/15 V 1.2 provides fonts for set symbols - TH
57
58
59
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LaTeX Font Info: Overwriting math alphabet '\mathbbm' in version
'bold'
(Font) U/bbm/m/n --> U/bbm/bx/n on input line 33.
LaTeX Font Info: Overwriting math alphabet '\mathbbmss' in version
'bold'
(Font) U/bbmss/m/n --> U/bbmss/bx/n on input line 35.
) (c:/TeXLive/2015/texmf-dist/tex/latex/lipsum/lipsum.sty
Package: lipsum 2014/07/27 v1.3 150 paragraphs of Lorem Ipsum dummy text
\c@lips@count=\count135
) (c:/TeXLive/2015/texmf-dist/tex/latex/adjustbox/adjustbox.sty
Package: adjustbox 2012/05/21 v1.0 Adjusting TeX boxes (trim, clip, ...)
(c:/TeXLive/2015/texmf-dist/tex/latex/adjustbox/adjcalc.sty
Package: adjcalc 2012/05/16 v1.1 Provides advanced setlength with
multiple back
-ends (calc, etex, pgfmath)
) (c:/TeXLive/2015/texmf-dist/tex/latex/adjustbox/trimclip.sty
Package: trimclip 2012/05/16 v1.0 Trim and clip general TeX material
(c:/TeXLive/2015/texmf-dist/tex/latex/collectbox/collectbox.sty
Package: collectbox 2012/05/17 v0.4b Collect macro arguments as boxes
\collectedbox=\box36
)
\tc@llx=\dimen142
\tc@lly=\dimen143
\tc@urx=\dimen144
\tc@ury=\dimen145
Package trimclip Info: Using driver 'tc-pdftex.def'.
(c:/TeXLive/2015/texmf-dist/tex/latex/adjustbox/tc-pdftex.def
File: tc-pdftex.def 2012/05/13 v1.0 Clipping driver for pdftex
))
\adjbox@Width=\dimen146
\adjbox@Height=\dimen147
\adjbox@Depth=\dimen148
\adjbox@Totalheight=\dimen149
(c:/TeXLive/2015/texmf-dist/tex/latex/ifoddpage/ifoddpage.sty
Package: ifoddpage 2011/09/13 v1.0 Conditionals for odd/even page
detection
\c@checkoddpage=\count136
) (c:/TeXLive/2015/texmf-dist/tex/latex/varwidth/varwidth.sty
Package: varwidth 2009/03/30 ver 0.92; Variable-width minipages
\@vwid@box=\box37
\sift@deathcycles=\count137
\@vwid@loff=\dimen150
\@vwid@roff=\dimen151
)) (c:/TeXLive/2015/texmf-dist/tex/latex/wrapfig/wrapfig.sty
\wrapoverhang=\dimen152
\WF@size=\dimen153
\c@WF@wrappedlines=\count138
\WF@box=\box38
\WF@everypar=\toks29
Package: wrapfig 2003/01/31 v 3.6
) (c:/TeXLive/2015/texmf-dist/tex/latex/multirow/multirow.sty
\bigstrutjot=\dimen154
) (c:/TeXLive/2015/texmf-dist/tex/latex/preprint/balance.sty
Package: balance 1999/02/23 4.3 (PWD)

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1
2
3
4 \oldvsize=\dimen155
5 ) (c:/TeXLive/2015/texmf-dist/tex/latex/url/url.sty
6 \Urlmuskip=\muskip11
7 Package: url 2013/09/16 ver 3.4 Verb mode for urls, etc.
8 ) (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/microtype.sty
9 Package: microtype 2013/05/23 v2.5a Micro-typographical refinements (RS)
10 \MT@toks=\toks30
11 \MT@count=\count139
12 LaTeX Info: Redefining \textls on input line 766.
13 \MT@outer@kern=\dimen156
14 LaTeX Info: Redefining \textmicrotypecontext on input line 1285.
15 \MT@listname@count=\count140
16 (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/microtype-pdftex.def
17 File: microtype-pdftex.def 2013/05/23 v2.5a Definitions specific to
18 pdftex (RS)
19
20
21 LaTeX Info: Redefining \lsstyle on input line 915.
22 LaTeX Info: Redefining \lslig on input line 915.
23 \MT@outer@space=\skip60
24 )
25 Package microtype Info: Loading configuration file microtype.cfg.
26 (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/microtype.cfg
27 File: microtype.cfg 2013/05/23 v2.5a microtype main configuration file
28 (RS)
29 ! Extra \else.
30 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
31                                     \def #3{#6}\expandafter
32 \e...
33 1.64    }
34
35 I'm ignoring this; it doesn't match any \if.
36
37 ! Extra \else.
38 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
39                                     \def #3{#6}\expandafter
40 \e...
41 1.64    }
42
43 I'm ignoring this; it doesn't match any \if.
44
45 ! Extra \else.
46 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
47                                     \def #3{#6}\expandafter
48 \e...
49 1.64    }
50
51 I'm ignoring this; it doesn't match any \if.
52
53 ! Extra \else.
54 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
55                                     \def #3{#6}\expandafter
56 \e...
57 1.64    }
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3
4 I'm ignoring this; it doesn't match any \if.
5
6 ! Extra \else.
7 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
8 \def #3{#6}\expandafter
9 \e...
10 1.64 }
11
12 I'm ignoring this; it doesn't match any \if.
13
14 ! Extra \else.
15 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
16 \def #3{#6}\expandafter
17 \e...
18 1.71 }
19
20 I'm ignoring this; it doesn't match any \if.
21
22 ! Extra \else.
23 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
24 \def #3{#6}\expandafter
25 \e...
26 1.71 }
27
28 I'm ignoring this; it doesn't match any \if.
29
30 ! Extra \else.
31 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
32 \def #3{#6}\expandafter
33 \e...
34 1.71 }
35
36 I'm ignoring this; it doesn't match any \if.
37
38 ! Extra \else.
39 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
40 \def #3{#6}\expandafter
41 \e...
42 1.71 }
43
44 I'm ignoring this; it doesn't match any \if.
45
46 ! Extra \else.
47 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
48 \def #3{#6}\expandafter
49 \e...
50 1.71 }
51
52 I'm ignoring this; it doesn't match any \if.
53
54 ! Extra \else.
55 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
56 \def #3{#6}\expandafter
57 \e...
58 1.71 }
59
60 I'm ignoring this; it doesn't match any \if.
61
62 ! Extra \else.
63 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
64 \def #3{#6}\expandafter
65 \e...

```

```

1
2
3
4     1.81      }
5
6     I'm ignoring this; it doesn't match any \if.
7
8     ! Extra \else.
9     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
10                                         \def #3{#6}\expandafter
11     \e...
12     1.81      }
13
14     I'm ignoring this; it doesn't match any \if.
15
16     ! Extra \else.
17     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
18                                         \def #3{#6}\expandafter
19     \e...
20     1.81      }
21
22     I'm ignoring this; it doesn't match any \if.
23
24     ! Extra \else.
25     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
26                                         \def #3{#6}\expandafter
27     \e...
28     1.81      }
29
30     I'm ignoring this; it doesn't match any \if.
31
32     ! Extra \else.
33     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
34                                         \def #3{#6}\expandafter
35     \e...
36     1.81      }
37
38     I'm ignoring this; it doesn't match any \if.
39
40     ! Extra \else.
41     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
42                                         \def #3{#6}\expandafter
43     \e...
44     1.86      }
45
46     I'm ignoring this; it doesn't match any \if.
47
48     ! Extra \else.
49     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
50                                         \def #3{#6}\expandafter
51     \e...
52     1.86      }
53
54     I'm ignoring this; it doesn't match any \if.
55
56     ! Extra \else.
57     \XKV@wh@list ...r \expandafter \XKV@wh@list \else
58                                         \def #3{#6}\expandafter
59     \e...
60     1.86      }
61
62     I'm ignoring this; it doesn't match any \if.
63
64     ! Extra \else.
65     \XKV@wh@list ...r \expandafter \XKV@wh@list \else

```

```

1
2
3
4                                     \def #3{#6}\expandafter
5 \e...
6 1.86      }
7
8 I'm ignoring this; it doesn't match any \if.
9
10 ! Extra \else.
11 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
12                                     \def #3{#6}\expandafter
13 \e...
14 1.86      }
15
16 I'm ignoring this; it doesn't match any \if.
17
18 ! Extra \else.
19 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
20                                     \def #3{#6}\expandafter
21 \e...
22 1.86      }
23
24 I'm ignoring this; it doesn't match any \if.
25
26 ! Extra \else.
27 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
28                                     \def #3{#6}\expandafter
29 \e...
30 1.89      { font = */*/*/*/* }
31
32 I'm ignoring this; it doesn't match any \if.
33
34 ! Extra \else.
35 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
36                                     \def #3{#6}\expandafter
37 \e...
38 1.89      { font = */*/*/*/* }
39
40 I'm ignoring this; it doesn't match any \if.
41
42 ! Extra \else.
43 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
44                                     \def #3{#6}\expandafter
45 \e...
46 1.89      { font = */*/*/*/* }
47
48 I'm ignoring this; it doesn't match any \if.
49
50 ! Extra \else.
51 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
52                                     \def #3{#6}\expandafter
53 \e...
54 1.89      { font = */*/*/*/* }
55
56 I'm ignoring this; it doesn't match any \if.
57
58 ! Extra \else.
59 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
60                                     \def #3{#6}\expandafter
61 \e...
62 1.89      { font = */*/*/*/* }
63
64 I'm ignoring this; it doesn't match any \if.
65

```

```

1
2
3
4 ! Extra \else.
5 \XKV@wh@list ...r \expandafter \XKV@wh@list \else
6                                     \def #3{#6}\expandafter
7 \e...
8 1.89 { font = */*/*/*/ }
9
10 I'm ignoring this; it doesn't match any \if.
11
12 )) (c:/TeXLive/2015/texmf-dist/tex/latex/algorithms/algorithm.sty
13 Package: algorithm 2009/08/24 v0.1 Document Style `algorithm' - floating
14 enviro
15 nment
16 \@float@every@algorithm=\toks31
17 \c@algorithm=\count141
18 ) (c:/TeXLive/2015/texmf-dist/tex/latex/algorithms/algorithmic.sty
19 Package: algorithmic 2009/08/24 v0.1 Document Style `algorithmic'
20 \c@ALC@unique=\count142
21 \c@ALC@line=\count143
22 \c@ALC@rem=\count144
23 \c@ALC@depth=\count145
24 \ALC@tlm=\skip61
25 \algorithmicindent=\skip62
26 ) (c:/TeXLive/2015/texmf-dist/tex/latex/breqn/breqn.sty
27 (c:/TeXLive/2015/texmf-
28 dist/tex/latex/l3kernel/expl3.sty
29 Package: expl3 2016/03/28 v6468 L3 programming layer (loader)
30 (c:/TeXLive/2015/texmf-dist/tex/latex/l3kernel/expl3-code.tex
31 Package: expl3 2016/03/28 v6468 L3 programming layer (code)
32 L3 Module: l3bootstrap 2016/02/12 v6412 L3 Bootstrap code
33 L3 Module: l3names 2016/03/11 v6433 L3 Namespace for primitives
34 L3 Module: l3basics 2015/11/22 v6315 L3 Basic definitions
35 L3 Module: l3expan 2015/09/10 v5983 L3 Argument expansion
36 L3 Module: l3tl 2016/03/26 v6465 L3 Token lists
37 L3 Module: l3str 2016/03/24 v6441 L3 Strings
38 L3 Module: l3seq 2015/08/05 v5777 L3 Sequences and stacks
39 L3 Module: l3int 2016/03/24 v6441 L3 Integers
40 \c_max_int=\count146
41 \l_tmpa_int=\count147
42 \l_tmpb_int=\count148
43 \g_tmpa_int=\count149
44 \g_tmpb_int=\count150
45 L3 Module: l3quark 2015/08/17 v5855 L3 Quarks
46 L3 Module: l3prg 2015/11/01 v6216 L3 Control structures
47 \g_prg_map_int=\count151
48 L3 Module: l3clist 2015/09/02 v5901 L3 Comma separated lists
49 L3 Module: l3token 2016/03/26 v6465 L3 Experimental token manipulation
50 L3 Module: l3prop 2016/01/05 v6366 L3 Property lists
51 L3 Module: l3msg 2016/03/26 v6464 L3 Messages
52 L3 Module: l3file 2016/03/25 v6458 L3 File and I/O operations
53 \l_iow_line_count_int=\count152
54 \l__iow_target_count_int=\count153
55 \l__iow_current_line_int=\count154
56 \l__iow_current_word_int=\count155
57 \l__iow_current_indentation_int=\count156
58
59
60
61
62
63
64
65

```

1
2
3
4 L3 Module: l3skip 2016/01/05 v6366 L3 Dimensions and skips

5 \c_zero_dim=\dimen157
6 \c_max_dim=\dimen158
7 \l_tmpa_dim=\dimen159
8 \l_tmpb_dim=\dimen160
9 \g_tmpa_dim=\dimen161
10 \g_tmpb_dim=\dimen162
11 \c_zero_skip=\skip63
12 \c_max_skip=\skip64
13 \l_tmpa_skip=\skip65
14 \l_tmpb_skip=\skip66
15 \g_tmpa_skip=\skip67
16 \g_tmpb_skip=\skip68
17 \c_zero_muskip=\muskip12
18 \c_max_muskip=\muskip13
19 \l_tmpa_muskip=\muskip14
20 \l_tmpb_muskip=\muskip15
21 \g_tmpa_muskip=\muskip16
22 \g_tmpb_muskip=\muskip17

23
24 L3 Module: l3keys 2015/11/17 v6284 L3 Key-value interfaces

25 \g_keyval_level_int=\count157
26 \l_keys_choice_int=\count158

27 L3 Module: l3fp 2016/03/26 v6465 L3 Floating points

28 \c_fp_leading_shift_int=\count159
29 \c_fp_middle_shift_int=\count160
30 \c_fp_trailing_shift_int=\count161
31 \c_fp_big_leading_shift_int=\count162
32 \c_fp_big_middle_shift_int=\count163
33 \c_fp_big_trailing_shift_int=\count164
34 \c_fp_Bigg_leading_shift_int=\count165
35 \c_fp_Bigg_middle_shift_int=\count166
36 \c_fp_Bigg_trailing_shift_int=\count167

37 L3 Module: l3box 2015/08/09 v5822 L3 Experimental boxes

38 \c_empty_box=\box39
39 \l_tmpa_box=\box40
40 \l_tmpb_box=\box41
41 \g_tmpa_box=\box42
42 \g_tmpb_box=\box43

43
44 L3 Module: l3coffins 2016/03/24 v6440 L3 Coffin code layer

45 \l_coffin_internal_box=\box44
46 \l_coffin_internal_dim=\dimen163
47 \l_coffin_offset_x_dim=\dimen164
48 \l_coffin_offset_y_dim=\dimen165
49 \l_coffin_x_dim=\dimen166
50 \l_coffin_y_dim=\dimen167
51 \l_coffin_x_prime_dim=\dimen168
52 \l_coffin_y_prime_dim=\dimen169
53 \c_empty_coffin=\box45
54 \l_coffin_aligned_coffin=\box46
55 \l_coffin_aligned_internal_coffin=\box47
56 \l_tmpa_coffin=\box48
57 \l_tmpb_coffin=\box49
58 \l_coffin_display_coffin=\box50
59 \l_coffin_display_coord_coffin=\box51
60
61
62
63
64
65

```

1
2
3
4 \l__coffin_display_pole_coffin=\box52
5 \l__coffin_display_offset_dim=\dimen170
6 \l__coffin_display_x_dim=\dimen171
7 \l__coffin_display_y_dim=\dimen172
8 L3 Module: l3color 2014/08/23 v5354 L3 Experimental color support
9 L3 Module: l3sys 2015/09/25 v6087 L3 Experimental system/runtime
10 functions
11 L3 Module: l3candidates 2016/03/25 v6456 L3 Experimental additions to
12 l3kernel
13 \l__box_top_dim=\dimen173
14 \l__box_bottom_dim=\dimen174
15 \l__box_left_dim=\dimen175
16 \l__box_right_dim=\dimen176
17 \l__box_top_new_dim=\dimen177
18 \l__box_bottom_new_dim=\dimen178
19 \l__box_left_new_dim=\dimen179
20 \l__box_right_new_dim=\dimen180
21 \l__box_internal_box=\box53
22 \l__coffin_bounding_shift_dim=\dimen181
23 \l__coffin_left_corner_dim=\dimen182
24 \l__coffin_right_corner_dim=\dimen183
25 \l__coffin_bottom_corner_dim=\dimen184
26 \l__coffin_top_corner_dim=\dimen185
27 \l__coffin_scaled_total_height_dim=\dimen186
28 \l__coffin_scaled_width_dim=\dimen187
29 L3 Module: l3luatex 2016/03/26 v6465 L3 Experimental LuaTeX-specific
30 functions
31 ) (c:/TeXLive/2015/texmf-dist/tex/latex/l3kernel/l3pdfmode.def
32 File: l3pdfmode.def 2016/03/26 v6465 L3 Experimental driver: PDF mode
33 \l__driver_color_stack_int=\count168
34 ))
35 Package: breqn 2015/08/11 v0.98d Breaking equations
36 (c:/TeXLive/2015/texmf-dist/tex/latex/breqn/flexisym.sty
37 Package: flexisym 2015/08/11 v0.98d Make math characters macros
38 LaTeX Info: Redefining \textprime on input line 299.
39 LaTeX Info: Redefining \not on input line 357.
40 (c:/TeXLive/2015/texmf-dist/tex/latex/breqn/cmbase.sym
41 File: cmbase.sym 2007/12/19 v0.92
42 LaTeX Info: Redefining \hbar on input line 324.
43 LaTeX Info: Redefining \surd on input line 326.
44 LaTeX Info: Redefining \angle on input line 334.
45 LaTeX Info: Redefining \neq on input line 335.
46 LaTeX Info: Redefining \mapsto on input line 336.
47 LaTeX Info: Redefining \cong on input line 337.
48 LaTeX Info: Redefining \notin on input line 340.
49 LaTeX Info: Redefining \rightleftharpoons on input line 341.
50 LaTeX Info: Redefining \doteq on input line 342.
51 LaTeX Info: Redefining \hookrightarrow on input line 343.
52 LaTeX Info: Redefining \hookleftarrow on input line 344.
53 LaTeX Info: Redefining \bowtie on input line 345.
54 LaTeX Info: Redefining \models on input line 346.
55 LaTeX Info: Redefining \Longrightarrow on input line 347.
56 LaTeX Info: Redefining \longrightarrow on input line 348.
57 LaTeX Info: Redefining \Longleftarrow on input line 349.
58
59
60
61
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```

```

1
2
3
4 LaTeX Info: Redefining \longleftarrow on input line 350.
5 LaTeX Info: Redefining \longmapsto on input line 351.
6 LaTeX Info: Redefining \longrightarrow on input line 352.
7 LaTeX Info: Redefining \Longleftarrow on input line 353.
8 LaTeX Info: Redefining \cdots on input line 357.
9 LaTeX Info: Redefining \vdots on input line 360.
10 LaTeX Info: Redefining \ddots on input line 365.
11 ) (c:/TeXLive/2015/texmf-dist/tex/latex/breqn/mathstyle.sty
12 Package: mathstyle 2015/08/11 v0.98d Tracking mathstyle implicitly
13 LaTeX Info: Redefining \displaystyle on input line 93.
14 LaTeX Info: Redefining \textstyle on input line 95.
15 LaTeX Info: Redefining \scriptstyle on input line 97.
16 LaTeX Info: Redefining \scriptscriptstyle on input line 99.
17 LaTeX Info: Redefining \genfrac on input line 145.
18
19 ))
20 \inf@bad=\count169
21 \maxint=\count170
22 \listwidth=\dimen188
23 \eqnumsep=\dimen189
24 \eqmargin=\dimen190
25 \eqlinespacing=\skip69
26 \eqlineskip=\skip70
27 \eqlineskiplimit=\dimen191
28 \eqbinoffset=\muskip18
29 \eqdelimoffset=\muskip19
30 \eqindentstep=\dimen192
31 \eqstyle=\toks32
32 \eqbreakdepth=\count171
33 \eqinterlinepenalty=\count172
34 \intereqpenalty=\count173
35 \intereqskip=\skip71
36 \prerelpenalty=\count174
37 \prebinoppenalty=\count175
38 \Dmedmuskip=\muskip20
39 \Dthickmuskip=\muskip21
40 \eqleftskip=\skip72
41 \eqrightskip=\skip73
42 \eq@vspan=\skip74
43 \eq@binoffset=\muskip22
44 \EQ@box=\box54
45 \EQ@copy=\box55
46 \EQ@numbox=\box56
47 \eq@wdNum=\dimen193
48 \GRP@numbox=\box57
49 \grp@wdNum=\dimen194
50 \eq@lines=\count176
51 \eq@curline=\count177
52 \eq@badness=\count178
53 \EQ@vims=\count179
54 \eq@dp=\dimen195
55 \eq@wdL=\dimen196
56 \eq@wdT=\dimen197
57 \eq@wdMin=\dimen198
58 \grp@wdL=\dimen199
59
60
61
62
63
64
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1
2
3
4 \grp@wdR=\dimen256
5 \grp@wdT=\dimen257
6 \eq@wdRmax=\dimen258
7 \eq@firstht=\dimen259
8 \eq@wdCond=\dimen260
9 \eq@indentstep=\dimen261
10 \eq@linewidth=\dimen262
11 \grp@linewidth=\dimen263
12 \eq@hshift=\dimen264
13 \eq@given@sidespace=\dimen265
14 \eq@final@linecount=\count180
15 \eq@wdR=\dimen266
16 \EQ@continue=\toks33
17 \lr@level=\count181
18 \GRP@queue=\toks34
19 \GRP@box=\box58
20 \GRP@wholebox=\box59
21 \darraycolsep=\skip75
22 \cur@row=\count182
23 \cur@col=\count183
24 \conditionsep=\skip76
25 ) (c:/TeXLive/2015/texmf-dist/tex/latex/footmisc/footmisc.sty
26 Package: footmisc 2011/06/06 v5.5b a miscellany of footnote facilities
27 \FN@temptoken=\toks35
28 \footnotemargin=\dimen267
29 \c@pp@next@reset=\count184
30 Package footmisc Info: Declaring symbol style bringhurst on input line
31 855.
32 Package footmisc Info: Declaring symbol style chicago on input line 863.
33 Package footmisc Info: Declaring symbol style wiley on input line 872.
34 Package footmisc Info: Declaring symbol style lamport-robust on input
35 line 883.
36
37 Package footmisc Info: Declaring symbol style lamport* on input line 903.
38 Package footmisc Info: Declaring symbol style lamport*-robust on input
39 line 924
40 .
41 )
42 \c@Changes@AddCountde=\count185
43 \c@Changes@DeleteCountde=\count186
44 \c@Changes@ReplaceCountde=\count187
45 (./gopinathargallauro2017.aux)
46 \openout1 = `gopinathargallauro2017.aux'.
47
48
49
50 LaTeX Font Info: Checking defaults for OML/cmm/m/it on input line 53.
51 LaTeX Font Info: ... okay on input line 53.
52 LaTeX Font Info: Checking defaults for T1/cmr/m/n on input line 53.
53 LaTeX Font Info: ... okay on input line 53.
54 LaTeX Font Info: Checking defaults for OT1/cmr/m/n on input line 53.
55 LaTeX Font Info: ... okay on input line 53.
56 LaTeX Font Info: Checking defaults for OMS/cmsy/m/n on input line 53.
57 LaTeX Font Info: ... okay on input line 53.
58 LaTeX Font Info: Checking defaults for OMX/cmex/m/n on input line 53.
59 LaTeX Font Info: ... okay on input line 53.
60
61
62
63
64
65

```

```

LaTeX Font Info:    Checking defaults for U/cmr/m/n on input line 53.
LaTeX Font Info:    ... okay on input line 53.
LaTeX Font Info:    Checking defaults for TS1/cmr/m/n on input line 53.
LaTeX Font Info:    ... okay on input line 53.
(c:/TeXLive/2015/texmf-dist/tex/context/base/supp-pdf.mkii
[Loading MPS to PDF converter (version 2006.09.02).]
\scratchcounter=\count188
\scratchdimen=\dimen268
\scratchbox=\box60
\nofMPsegments=\count189
\nofMParguments=\count190
\everyMPshowfont=\toks36
\MPscratchCnt=\count191
\MPscratchDim=\dimen269
\MPnumerator=\count192
\makeMPintoPDFobject=\count193
\everyMPtoPDFconversion=\toks37
) (c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/pdftexcmds.sty
Package: pdftexcmds 2011/11/29 v0.20 Utility functions of pdfTeX for
LuaTeX (HO
)
(c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/ifluatex.sty
Package: ifluatex 2010/03/01 v1.3 Provides the ifluatex switch (HO)
Package ifluatex Info: LuaTeX not detected.
) (c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/ifpdf.sty
Package: ifpdf 2011/01/30 v2.3 Provides the ifpdf switch (HO)
Package ifpdf Info: pdfTeX in PDF mode is detected.
)
Package pdftexcmds Info: LuaTeX not detected.
Package pdftexcmds Info: \pdf@primitive is available.
Package pdftexcmds Info: \pdf@ifprimitive is available.
Package pdftexcmds Info: \pdfdraftmode found.
) (c:/TeXLive/2015/texmf-dist/tex/latex/oberdiek/epstopdf-base.sty
Package: epstopdf-base 2010/02/09 v2.5 Base part for package epstopdf
(c:/TeXLive/2015/texmf-dist/tex/latex/oberdiek/grfext.sty
Package: grfext 2010/08/19 v1.1 Manage graphics extensions (HO)
(c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/kvdefinekeys.sty
Package: kvdefinekeys 2011/04/07 v1.3 Define keys (HO)
)) (c:/TeXLive/2015/texmf-dist/tex/latex/oberdiek/kvoptions.sty
Package: kvoptions 2011/06/30 v3.11 Key value format for package options
(HO)
(c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/kvsetkeys.sty
Package: kvsetkeys 2012/04/25 v1.16 Key value parser (HO)
(c:/TeXLive/2015/texmf-dist/tex/generic/oberdiek/etexcmds.sty
Package: etexcmds 2011/02/16 v1.5 Avoid name clashes with e-TeX commands
(HO)
Package etexcmds Info: Could not find \expanded.
(etexcmds)          That can mean that you are not using pdfTeX 1.50
or
(etexcmds)          that some package has redefined \expanded.
(etexcmds)          In the latter case, load this package earlier.
)))
Package grfext Info: Graphics extension search list:

```

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1
2
3
4 (grfext)
5 [.png,.pdf,.jpg,.mps,.jpeg,.jbig2,.jb2,.PNG,.PDF,.JPG,.JPE
6 G,.JBIG2,.JB2,.eps]
7 (grfext) \AppendGraphicsExtensions on input line 452.
8 (c:/TeXLive/2015/texmf-dist/tex/latex/latexconfig/epstopdf-sys.cfg
9 File: epstopdf-sys.cfg 2010/07/13 v1.3 Configuration of (r)epstopdf for
10 TeX Liv
11 e
12 ))
13 LaTeX Info: Redefining \microtypecontext on input line 53.
14 Package microtype Info: Generating PDF output.
15 Package microtype Info: Character protrusion enabled (level 2).
16 Package microtype Info: Using default protrusion set `alltext'.
17 Package microtype Info: Automatic font expansion enabled (level 2),
18 (microtype) stretch: 20, shrink: 20, step: 1, non-selected.
19 Package microtype Info: Using default expansion set `basictext'.
20 Package microtype Info: No adjustment of tracking.
21 Package microtype Info: No adjustment of interword spacing.
22 Package microtype Info: No adjustment of character kerning.
23 (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/mt-cmr.cfg
24 File: mt-cmr.cfg 2013/05/19 v2.2 microtype config. file: Computer Modern
25 Roman
26 (RS)
27 )
28 LaTeX Font Info: Try loading font information for U+msa on input line
29 87.
30 (c:/TeXLive/2015/texmf-dist/tex/latex/amsfonts/umsa.fd
31 File: umsa.fd 2013/01/14 v3.01 AMS symbols A
32 ) (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/mt-msa.cfg
33 File: mt-msa.cfg 2006/02/04 v1.1 microtype config. file: AMS symbols (a)
34 (RS)
35 )
36 LaTeX Font Info: Try loading font information for U+msb on input line
37 87.
38 (c:/TeXLive/2015/texmf-dist/tex/latex/amsfonts/umsb.fd
39 File: umsb.fd 2013/01/14 v3.01 AMS symbols B
40 ) (c:/TeXLive/2015/texmf-dist/tex/latex/microtype/mt-msb.cfg
41 File: mt-msb.cfg 2005/06/01 v1.0 microtype config. file: AMS symbols (b)
42 (RS)
43 )
44 LaTeX Font Info: Font shape `U/lasy/b/n' in size <7> not available
45 (Font) Font shape `U/lasy/m/n' tried instead on input line
46 87.
47 LaTeX Font Info: Font shape `U/lasy/b/n' in size <5> not available
48 (Font) Font shape `U/lasy/m/n' tried instead on input line
49 87.
50 LaTeX Font Info: Calculating math sizes for size <8.5> on input line
51 87.
52 Package epstopdf Info: Source file: <Fig1.eps>
53 (epstopdf) date: 2018-05-04 22:42:18
54 (epstopdf) size: 3011293 bytes
55 (epstopdf) Output file: <Fig1-eps-converted-to.pdf>
56 (epstopdf) date: 2018-05-04 22:42:34
57 (epstopdf) size: 1698620 bytes
58
59
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1
2
3
4 (epstopdf) Command: <repstopdf --outfile=Fig1-eps-converted-
5 to.pdf
6 Fig1.eps>
7 (epstopdf) \includegraphics on input line 102.
8 Package epstopdf Info: Output file is already uptodate.
9 <Fig1-eps-converted-to.pdf, id=1, 1659.19875pt x 1281.78876pt>
10 File: Fig1-eps-converted-to.pdf Graphic file (type pdf)
11 <use Fig1-eps-converted-to.pdf>
12 Package pdftex.def Info: Fig1-eps-converted-to.pdf used on input line
13 102.
14 (pdftex.def) Requested size: 420.75302pt x 325.04265pt.
15 LaTeX Font Info: Font shape `U/lasy/b/n' in size <8.5> not available
16 (Font) Font shape `U/lasy/m/n' tried instead on input line
17 103.
18 LaTeX Font Info: Font shape `U/lasy/b/n' in size <5.94997> not
19 available
20 (Font) Font shape `U/lasy/m/n' tried instead on input line
21 103.
22 LaTeX Font Info: Font shape `U/lasy/b/n' in size <4.25> not available
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24 103.
25 [1{c:/TeXLive/2015/texmf-var/fonts/map/pdftex/updmap/pdftex.map}]
26
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29 ]
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36 (epstopdf) Command: <repstopdf --outfile=Fig2-eps-converted-
37 to.pdf
38 Fig2.eps>
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40 Package epstopdf Info: Output file is already uptodate.
41 <Fig2-eps-converted-to.pdf, id=16, 663.47874pt x 478.78876pt>
42 File: Fig2-eps-converted-to.pdf Graphic file (type pdf)
43 <use Fig2-eps-converted-to.pdf>
44 Package pdftex.def Info: Fig2-eps-converted-to.pdf used on input line
45 122.
46 (pdftex.def) Requested size: 173.25302pt x 125.02275pt.
47 [2]
48 Underfull \vbox (badness 10000) has occurred while \output is active []
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54 [3 <./Fig1-eps-converted-to.pdf> <./Fig2-eps-converted-to.pdf>]
55 Underfull \vbox (badness 2426) has occurred while \output is active []
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58 [4]
59 Package epstopdf Info: Source file: <Fig3.eps>
60 (epstopdf) date: 2018-05-04 22:42:18
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4 (epstopdf) size: 49232 bytes
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10 Fig3.eps>
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15 <use Fig3-eps-converted-to.pdf>
16 Package pdftex.def Info: Fig3-eps-converted-to.pdf used on input line
17 166.
18 (pdftex.def) Requested size: 238.96417pt x 218.92393pt.
19
20
21 LaTeX Warning: `h' float specifier changed to `ht'.
22
23 [5 <./Fig3-eps-converted-to.pdf>]
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39 217.
40 (pdftex.def) Requested size: 569.2567pt x 281.47266pt.
41 [6] [7 <./Fig4-eps-converted-to.pdf>] [8]
42 LaTeX Font Info: Try loading font information for U+bbm on input line
43 304.
44 (c:/TeXLive/2015/texmf-dist/tex/latex/bbm-macros/ubbm.fd
45 File: ubbm.fd 1999/03/15 V 1.2 Font definition for bbm font - TH
46 )
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4 File: Fig5-eps-converted-to.pdf Graphic file (type pdf)
5 <use Fig5-eps-converted-to.pdf>
6 Package pdftex.def Info: Fig5-eps-converted-to.pdf used on input line
7 325.
8 (pdftex.def) Requested size: 238.96533pt x 133.15742pt.
9 [9]
10 Overfull \hbox (4.17566pt too wide) in paragraph at lines 334--335
11 \OT1/cmr/m/n/10 (-20) func-tion. In this ex-am-ple, the user's in-tended
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18 Underfull \vbox (badness 10000) has occurred while \output is active []
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21 LaTeX Font Warning: Font shape `U/bbm/m/n' in size <8.5> not available
22 (Font) size <8> substituted on input line 369.
23
24
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44 381.
45 (pdftex.def) Requested size: 495.0pt x 139.21115pt.
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4 <use Fig6-eps-converted-to.pdf>
5 Package pdftex.def Info: Fig6-eps-converted-to.pdf used on input line
6 396.
7 (pdftex.def) Requested size: 238.9604pt x 86.55336pt.
8
9 Overfull \hbox (8.94446pt too wide) in paragraph at lines 404--406
10 []\OT1/cmr/m/n/10 (-20) The switch-based head ar-ray consisted of three
11 switch
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17 Overfull \hbox (1.40538pt too wide) in paragraph at lines 427--428
18 $[]$\OT1/cmr/m/n/10 (-20) : In the sec-ond phase of train-ing, the
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22 [11]
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31 Fig8.eps>
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33 Package epstopdf Info: Output file is already uptodate.
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37 Package pdftex.def Info: Fig8-eps-converted-to.pdf used on input line
38 450.
39 (pdftex.def) Requested size: 450.45181pt x 245.0995pt.
40 [12 <./Fig7-eps-converted-to.pdf> <./Fig6-eps-converted-to.pdf>]
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57 (pdftex.def) Requested size: 415.79819pt x 313.8916pt.
58 [13 <./Fig8-eps-converted-to.pdf>]
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18 Package pdftex.def Info: Fig10-eps-converted-to.pdf used on input line
19 498.
20 (pdftex.def) Requested size: 238.96417pt x 172.73355pt.
21
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23 LaTeX Warning: `!h' float specifier changed to `!ht'.
24
25 Package epstopdf Info: Source file: <Fig11.eps>
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33 Fig11.eps>
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37 File: Fig11-eps-converted-to.pdf Graphic file (type pdf)
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39 Package pdftex.def Info: Fig11-eps-converted-to.pdf used on input line
40 505.
41 (pdftex.def) Requested size: 396.00151pt x 164.95451pt.
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44 Underfull \vbox (badness 10000) has occurred while \output is active []
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46 [14 <./Fig9-eps-converted-to.pdf> <./Fig10-eps-converted-to.pdf>] [15
47 <./Fig11-
48 eps-converted-to.pdf>]
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56 Package balance Warning: You have called \balance in second column
57 (balance) Columns might not be balanced.
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28 15858 strings out of 493027
29 270002 string characters out of 6137679
30 474675 words of memory out of 5000000
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32 27395 words of font info for 199 fonts, out of 8000000 for 9000
33 1141 hyphenation exceptions out of 8191
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35 5000i,500n,10000p,200000b,80000s
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22 bm10.pfb>
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Output written on gopinathargallauro2017.pdf (18 pages, 3825295 bytes).

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etc.)**

ReviewerResponse_AURO-D-17-00250.pdf



Biography – Deepak E. Gopinath

Deepak E. Gopinath is a third-year doctoral student in the Mechanical Engineering Department at Northwestern University and works with Dr. Brenna Argall in the Assistive and Rehabilitation Robotics Laboratory at the Shirley Ryan AbilityLab in Chicago. He completed his B.Tech in Engineering Physics from IIT Bombay in 2007, after which he moved to Boston, USA to pursue a Professional Diploma in Music at Berklee College of Music majoring in Composition and Jazz Performance. Prior to coming to Northwestern, he completed an M.S in Music Technology at Georgia Tech under Dr. Gil Weinberg where he worked in field of Robotic Musicianship. His current research interests are in developing mathematical formalisms for shared-control architectures for assistive robotic manipulators and information theoretic approaches to characterize human-robot interaction.

Bio-Dr. Brenna Argall

Brenna Argall is an Associate Professor of Electrical Engineering & Computer Science, Mechanical Engineering and Physical Medicine & Rehabilitation at Northwestern University. She is also a Faculty Research Scientist at the Shirley Ryan AbilityLab, the premier rehabilitation hospital in the United States. She is the director of the assistive & rehabilitation robotics **laboratory (argallab)**. Her research lies in the intersection of robotics, machine learning and human rehabilitation. The mission of the **argallab** is to advance human ability by leveraging autonomy. Dr. Argall is a 2016 recipient of the NSF CAREER award, and her Ph.D. in Robotics (2009) was received from the Robotics Institute at Carnegie Mellon University, as well as her M.S in Robotics (2006) and B.S in Mathematics (2002). Prior to joining Northwestern, she was a postdoctoral fellow (2009-2011) at the École polytechnique fédérale de Lausanne (EPFL), and prior to graduate school she held a Computational Biology position at the National Institutes of Health (NIH).



