# LaTeX Physics Package in MathJax Mimicking Some of the Commands in LaTeX Physics Package

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## 1 LaTeX Physics Package

This extension is to mimick LaTeX Physics Package<sup>1</sup> in MathJax.

# 2 Commands not Working/Included

- Matrix Macros are not implemented yet
- Commands are not working whenever any one of these is true:
  - \* modified command
  - [] modified command
  - variable no. of arguments
  - Best example containing all of the above:  $\dv, from \dv{} to \dv*[]{}{}$

 $<sup>^{1} \</sup>rm http://www.ctan.org/pkg/physics$ 

• Different names with the same commands are not implemented yet, but it is easy to be done.

#### 3 MathJax Macro

The extension is equivalent to the following macro:

```
<script type="text/x-mathjax-config">
MathJax. Hub. Config ({
    TeX: \{
         Macros: {
\begin{array}{ll} pqty \colon \ \left[ \ \| \left\{ \left( \ \ \ \ \right) \right\} \| \ , 1 \right] , \\ bqty \colon \ \left[ \ \| \left\{ \left( \ \ \ \ \ \ \ \right) \right\} \| \ , 1 \right] , \end{array} \right.
Bqty: ["\{ \setminus \{ \downarrow \#1 \downarrow \setminus \} \} ", 1],
abs: ["{\langle vert \_\#1 \_ \backslash vert \}", 1],
norm: ["{\langle vert \rangle vert \_\#1 \_ \langle vert \rangle ",1]}
eval: \ ["{\#1}\_\backslash \backslash vert \}", 1],
order: ["{\langle \mathbf{A}_{\mathsf{A}}(0), \mathbf{A}_{\mathsf{A}_{\mathsf{A}}}(0), \mathbf{A}_{\mathsf{A}_{\mathsf{A}}}(0), \mathbf{A}_{\mathsf{A}_{\mathsf{A}}}],
comm: [ " \{ \setminus [ \#1_{,} , \#2_{,} \setminus ] \} ", 2 ],
acomm: ["\{\setminus\setminus\{ \cup\#1_{\cup}, \cup\#2_{\cup}\setminus\setminus\}\}]", 2],
vb: ["{\\boldsymbol{\_#1\_}}",1],
va: ["{\langle \vee c {\langle \vee boldsymbol{\langle \#1 \rangle }} \rangle}",1],
vu: ["\{\{\setminus boldsymbol\{\setminus hat\{\_\#1\_\}\}\}\}",1],
 \begin{array}{l} vdot \colon \left[ \text{"}\left\{ \middle\setminus boldsymbol \middle\setminus cdot \right\} \text{"} \right], \\ cross \colon \left[ \text{"}\left\{ \middle\setminus boldsymbol \middle\setminus times \right\} \text{"} \right], \end{array} 
grad: ["{\ \ \ \ } boldsymbol \ \ \ nabla}"],
\operatorname{div}: ["\{\setminus \operatorname{grad} \setminus \operatorname{vdot}\}"],
curl: ["{\c grad \c cross}"].
laplacian: ["\{\setminus nabla^2\}"],
\operatorname{tr}: \ ["\{\setminus \operatorname{text}\{\operatorname{tr}_{\smile}\}\}"],
Tr: ["\{\setminus text\{Tr_{\smile}\}\}"],
rank: ["{\\text{rank_}}}"],
erf: ["{\\text{erf_}}}"],
Res: ["{\langle text{Res} \rangle}"],
pv: ["{\backslash mathcal{P}}"],
PV \colon \ \left[ \, "\left\{ \left\langle \left\langle \, \operatorname{text}\left\{ P.V. \right\} \right. \right\} \, \right] \, , \right.
Re: ["{\text{Re}}_{-} \ / {\ _{\#1}_{-} \ /}]", 1],
Im: ["{\text{Im}}_{\_} \setminus {\{\_\#1\_\setminus\}}]",1],
qq: ["{\langle quad \rangle text{\langle \#1_{ }\rangle } \rangle quad}",1],
qc: ["{\langle text \{,\} \rangle quad}]"],
qcc: ["{\langle quad \rangle text \{c.c.\} \rangle quad}"],
qif: ["{\quad\text{if}}\quad}"],
qthen: ["{\quad\text{then}}\quad}"],
qelse: ["{\quad \text{else} \ \ \ ]},
qotherwise: ["{\\quad\\text{otherwise}\\quad}"],
qunless: \ ["\{\ \backslash \ quad \ \backslash \ text\{unless\} \ \backslash \ quad\}"] \ ,
qgiven: ["{\\quad\\text{given}\\quad}"],
qusing: ["{\langle uad \rangle text \{using \} \rangle }],
```

```
qassume: \ ["\{ \setminus \{uad \setminus text \{assume\} \setminus \{uad\}"], 
qsince: ["{\\quad\\text{since}\\quad}"],
qlet: ["{\\quad\\text{let}\\quad}"],
qfor: ["{\quad\text{for}\duad}"],
qall: ["{\quad \setminus text{all} \setminus quad}"],
\ qeven: \ \left[\, \text{"}\left\{ \left\backslash \left\langle quad \right\backslash \left\langle text\left\{ even \right\} \right\rangle \right\rangle quad \right\}\, \text{"}\, \right],
qodd: \ ["\{\setminus \{quad \setminus text \{odd\} \setminus \{quad\}"],
qinteger: ["{\quad\text{integer}\duad}"],
qand: ["{\\quad\\text{and}\\quad\"],
qor: ["{\\quad\\text{or}\\quad\"],
qas: \ \left[\, \text{"}\left\{\, \backslash \, \text{quad} \, \backslash \, \text{text}\left\{\, as \,\right\}\, \backslash \, \text{quad} \,\right\}\, \text{"}\, \right]\,,
qin: ["{\langle quad \rangle text \{in \} \rangle quad}"],
dd: ["{\langle text{d} \rangle}"],
dv: ["{\ frac {\ text {d} {\_\#1\_} }} {\ text {d} {\_\#2\_} }}",2],
pdv: \ ["\{ \land frac \{ \land partial \{ \ \#1 \ \} \} \{ \land partial \{ \ \#2 \ \} \} \} ", 2],
var: ["{\langle delta \}"]}
fdv: \ ["\{ \ \ \text{frac} \{ \ \ \ \text{delta} \{ \ \#1\_ \} \} \{ \ \ \ \text{delta} \{ \ \#2\_ \} \} \} ", 2],
ket: ["\{\setminus vert \cup \{ \cup \#1 \cup \} \cup \setminus rangle \}", 1],
bra: ["{\langle \langle langle \langle \langle \#1 \rangle \rangle \rangle \rangle } vert ",1],
braket: \ ["\{\backslash langle \cup \{\#1\} \cup \backslash vert \cup \{\cup \#2\} \cup \backslash rangle\}", 2],
ketbra: ["{\langle vert | \{ \bot \#1 \rfloor \} \bot \rangle | rangle | \{ \bot \#2 \} \bot \rangle | vert \}", 2],
ev: ["{\langle \langle langle \langle \#1 \rangle \rangle \langle \langle rangle \rangle}", 1],
mel: ["{\\lceil (\#3) \rceil \vee \operatorname{crt} \{ \#3 \} \rceil } 
    }
});
</script>
```

### 4 Test

You can use the following table to test which commands in the Physics packages are available and working. Note, some of the commands are not working yet.

Automatic Bracing	Code
(a)	
[a]	
$\{a\}$	
a	
a	
$a\Big _{1}^{2}$	$\operatorname{\mathbb{L}}_1^2$
$\mathcal{O}(x)$	
[A,B]	$\cmale$ A}{B}
$\{A,B\}$	$\alpha(A){B}$

Vector Notation	Code
a	
$\psi$	
$\boldsymbol{a}$	\vb*{}
$oldsymbol{\psi}$	\vb*{}
$\vec{\mathbf{a}}$	
$ec{\psi}$	
$ec{a}$	\va*{}
$ec{ec{u}} \ ec{ec{a}} \ ec{ec{\psi}}$	\va*{}
â	
$\hat{\mathbf{a}}$ $\hat{\psi}$	
$\hat{m{a}}$	\vu*{}
$\hat{oldsymbol{\psi}}$	\vu*{}
•	\vdot
×	\cross
$\nabla(\psi)$	\grad()
$\mathbf{\nabla}[\psi]$	\grad[]
$\nabla \psi$	
$\nabla \cdot (\psi)$	\div()
$\nabla \cdot [\psi]$	\div[]
$\nabla \cdot \psi$	
$\nabla \times (\psi)$	\curl()
$\nabla \times [\psi]$	\curl[]
$\nabla \times \psi$	
$\nabla^2(\psi)$	\laplacian()
$\nabla^2[\psi]$	\laplacian[]
$\nabla^2 \psi$	

Operators	Code
$\sin x$	\sin
$\sin(x)$	$\sin()$
$\sin^2(x)$	\sin[2]()
$\operatorname{tr} \rho$	\tr
$\operatorname{Tr} \rho$	\Tr
${\rm rank} M$	\rank
$\operatorname{erf}(x)$	\erf()
$\operatorname{Res}[f(z)]$	\Res[]
$\mathcal{P} \int f(z) dz$	
$P.V.\int f(z) dz$	
$\operatorname{Re}\{z\}$	
$\underline{\operatorname{Im}\{z\}}$	

Quick Quad Text	Code
some texts	
some texts	\qq*{}
,	\qc
c.c.	\qcc
if	\qif
then	\qthen
else	\qelse
otherwise	\qotherwise
unless	\qunless
given	\qgiven
using	\qusing
assume	\qassume
since	\qsince
let	\qlet
for	\qfor
all	\qall
even	\qeven
odd	\qodd
integer	\qinteger
and	\qand
or	\qor
as	\qas
in	\qin

Derivatives	Code	
dx		
$d^3x$	$\d[3]{x}$	
$d(\cos \theta)$	\dd()	
$\frac{\mathrm{d}}{\mathrm{d}x}$		
$\frac{dx}{df}$	${x}$	
$\frac{d^n f}{d - n}$	$dv[]{f}{x}$	
$\frac{\frac{\mathrm{d}x}{\mathrm{d}n}f}{\frac{\mathrm{d}x}{\mathrm{d}x}}$ $\frac{\mathrm{d}}{\mathrm{d}x}(x^2 + x^3)$	$\dv{x}()$	
$\frac{\mathrm{d}x}{\mathrm{d}f}/\mathrm{d}x$	$\dv*{}{x}$	
$\frac{\partial}{\partial x}$		
$\frac{\partial f}{\partial x}$	${x}$	
$\frac{\partial^{n} f}{\partial x^{n}}$	\pdv[]{f}{x}	
$\frac{\frac{\partial}{\partial x} \frac{f}{n}}{\frac{\partial}{\partial x} (x^2 + x^3)}$ $\frac{\frac{\partial^2 f}{\partial x \partial y}}{\frac{\partial}{\partial x} \frac{\partial^2 f}{\partial x \partial y}}$	\pdv{x}()	
$\frac{\partial^2 f}{\partial x \partial y}$	${x}{y}$	
$\delta F[g(x)]$		
$\delta(E-TS)$	<pre>\var()</pre>	
$\frac{\delta}{\delta a}$		
$\frac{\frac{\delta q}{\delta F}}{\frac{\delta}{\delta V}} (E - TS)$	${g}$	
$\frac{\delta}{\delta V}(E-TS)$	\fdv{V}()	
$\frac{\delta V}{\delta F/\delta x}$	\fdv*{}{x}	

Dirac Bracket Notation	Code
$ \psi\rangle$	
$ \psi\rangle$	$\ket*{}$
$\langle \psi  $	
$\langle \psi  $	\bra*{}
$\langle a b\rangle$	\braket{a}{b}
$\langle a b\rangle$	\braket*{a}{b}
$\langle \psi   \psi \rangle$	
$ a\rangle\langle b $	$\ketbra{a}{b}$
$ a\rangle\!\langle b $	\ketbra*{a}{b}
$ \psi\rangle\langle\psi $	
$\langle \psi \rangle$	
$\langle \psi   A   \psi \rangle$	${\psi}$
$\langle \psi  angle$	\ev*{}
$\langle \psi \rangle$	\ev**{}
$\langle m A n\rangle$	$\mathbf{m}_{n}$
$\langle m A n\rangle$	$mel*{m}{}$
$\langle m A n\rangle$	$\mathtt{\mbox{\tt mel**{\tt m}}{\tt {\tt m}}{\tt {\tt m}}}$