

# The magref package\*

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## 1 Introduction

This document describes the **magref** package, a collection of macros to facilitate the writing of papers and reports on magnetic refrigeration. It just defines common macros and loads packages that are normally used:

- engsymbols
- sinuitx
- mhchem
- ifthen

Please notice that the user should refer to other references such as papers and textbooks to get the meaning of the symbols I describe here.

## 2 Implementation

The use of the conditional commands to define these custom macro is because some packages and classes that I use in conjunction with **magref** provide some obscure commands that clash with them. A normal user should not have any problems with that.

### 2.1 Specific heats

```
1 \newcommand{\cpo}{c_{p,0}}  
2 \newcommand{\cvo}{c_{v,0}}
```

### 2.2 Common refrigeration and thermodynamic parameters

```
3 \newcommand{\qe}{\rate{Q}\ped{e}}  
4 \newcommand{\dtspan}{\Delta{T}\ped{span}}
```

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\*This document corresponds to **magref** v0.3?, dated 2016/05/27.

```

5 \newcommand{\w}{\rate{W}}
6 \newcommand{\wpump}{\w\ped{p}}
7 \newcommand{\wmag}{\w\ped{m}}
8 \newcommand{\wvisc}{\w\ped{visc}}
9 \newcommand{\cop}{\mathrm{COP}}
10 \newcommand{\dtad}{\Delta{}T\ped{ad}}
11 \newcommand{\dsm}{\Delta{}s\ped{m}}
12 \newcommand{\tc}{T\ped{C}}
13 \ifthenelse{\isundefined{\th}}{\newcommand{\th}{T\ped{H}}}{\renewcommand{\th}{T\ped{H}}}
14 \newcommand{\qc}{\rate{Q}\ped{C}}
15 \newcommand{\qh}{\rate{Q}\ped{H}}
16 \newcommand{\ths}{T\ped{H,s}}
17 \newcommand{\tcs}{T\ped{C,s}}
18 \newcommand{\lcool}{\Lambda\ped{cool}}
19 \newcommand{\tcurie}{T\ped{Curie}}
20 \newcommand{\ntu}{\mathrm{NTU}}

```

## 2.3 Common vector fields

```

21 \newcommand{\rvec}{\nvector{r}}
22 \newcommand{\nvH}{\nvector{H}}
23 \newcommand{\nvB}{\nvector{B}}
24 \newcommand{\nvA}{\nvector{A}}
25 \newcommand{\nvrem}{\nvector{B}\ped{rem}}
26 \newcommand{\nvbrem}{\nvrem}
27 \newcommand{\nvM}{\nvector{M}}
28 \newcommand{\nvDip}{\nvector{m}}
29 \newcommand{\nvnetdip}{\nvector{\mathcal{M}}}
30 \newcommand{\nvbremhat}{\hat{\nvector{B}}\ped{rem}}
31 \newcommand{\nvbi}{\nvector{B}_k}
32 \newcommand{\nvhi}{\nvector{H}_k}
33 \newcommand{\nvremi}{\nvector{B}_{\mathrm{rem},k}}
34 \newcommand{\nvbremit}{\nvremi}
35 \newcommand{\nvai}{\nvector{A}_k}
36 \newcommand{\nvha}{\nvH\ped{a}}
37 \newcommand{\nvhd}{\nvH\ped{d}}

```

## 2.4 Scalar fields defined from vector fields

```

38 \newcommand{\nha}{H\ped{a}}

```

## 2.5 Common other scalar parameters

```

39 \newcommand{\mur}{\mu\ped{r}}
40 \newcommand{\bl}{B\ped{l}}
41 \newcommand{\bh}{B\ped{h}}
42 \newcommand{\hal}{H\ped{a,l}}
43 \newcommand{\hah}{H\ped{a,h}}
44 \newcommand{\brem}{B\ped{rem}}
45 \newcommand{\muri}{\mu_{\mathrm{r},k}}
46 \newcommand{\bremit}{B_{\mathrm{rem},k}}
47 \newcommand{\avgb}[1]{\left\langle B^{\frac{2}{3}} \right\rangle\ped{#1}}

```

```
48 \newcommand{\qmce}{q'\ped{MCE}}
```

## 2.6 Aliases from common terms

```
49 \newcommand{\ndfeb}{\ce{Nd{-}Fe{-}B} }
```

## 2.7 Thermodynamic potentials

```
50 \newcommand{\sigmaxdh}{\sigma \diffd{H\ped{a}}}
```

```
51 \newcommand{\hxdsigma}{H\ped{a}\diffd{\sigma}}
```

## 2.8 Geometric parameters

```
52 \newcommand{\ri}{R\ped{i}}
```

```
53 \ifthenelse{\isundefined{\ro}}{\newcommand{\ro}{R\ped{o}}}{\renewcommand{\ro}{R\ped{o}}}
```

```
54 \newcommand{\rg}{R\ped{g}}
```

```
55 \newcommand{\rs}{R\ped{s}}
```

```
56 \newcommand{\rc}{R\ped{c}}
```

```
57 \newcommand{\re}{R\ped{e}}
```

```
58 \newcommand{\hgap}{h\ped{gap}}
```

## 2.9 Coefficients for the analytical solution

```
59 \newcommand{\acoef}[2]{a_{\{#1\},\mathrm{#2}}}
```

```
60 \newcommand{\bcoef}[2]{b_{\{#1\},\mathrm{#2}}}
```

```
61 \newcommand{\Azexpr}[1]{A_{\mathrm{#1}\backslash, z}}
```

```
62 \newcommand{\bremii}{B_{\mathrm{rem,II}}}
```

```
63 \newcommand{\bremiv}{B_{\mathrm{rem,IV}}}
```

```
64 \newcommand{\murn}[1]{\mu\ped{r,#1}}
```

```
65 \newcommand{\aIII}{\acoef{1}{III}}
```

```
66 \newcommand{\bIII}{\bcoef{1}{III}}
```

```
67 \newcommand{\nvbIII}{\nvector{B}\ped{III}}
```

```
68 \newcommand{\BIII}{B\ped{III}}
```