# Examples of how to use `shortex.sty`

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## 1 Brackets and bracket-like functions

You can specify a bracket size using $*$ for `\left` and `\right` or one of the standard size choices (`\big`, `\Big`, `\bigg`, `\Bigg`).

| Description | Example | Text style | Display style |
|---|---|---|---|
| Round brackets (i.e., parentheses) | `\rbra{\frac{x}{y}}` | $(\frac{x}{y})$ | $(\dfrac{x}{y})$ |
| Curly brackets | `\cbra*{\frac{x}{y}}` | $\left\{\frac{x}{y}\right\}$ | $\left\{\dfrac{x}{y}\right\}$ |
| Square brackets | `\sbra[\bigg]{\frac{x}{y}}` | $\bigg[\frac{x}{y}\bigg]$ | $\bigg[\dfrac{x}{y}\bigg]$ |

Many other bracket-like, semantic commands are also available:

| Description | Example | Text style | Display style |
|---|---|---|---|
| Absolute value | `\abs{\frac{x}{y}}` | $\lvert\tfrac{x}{y}\rvert$ | $\lvert\dfrac{x}{y}\rvert$ |
| Set | `\set{\frac{x}{y}, \frac{y}{z}}` | $\{\tfrac{x}{y}, \tfrac{y}{z}\}$ | $\{\dfrac{x}{y}, \dfrac{y}{z}\}$ |
| Floor | `\floor{\frac{x}{y}}` | $\lfloor\tfrac{x}{y}\rfloor$ | $\lfloor\dfrac{x}{y}\rfloor$ |
| Ceiling | `\ceil{\frac{x}{y}}` | $\lceil\tfrac{x}{y}\rceil$ | $\lceil\dfrac{x}{y}\rceil$ |
| Norm | `\norm{\frac{x}{y}}` | $\lVert\tfrac{x}{y}\rVert$ | $\lVert\dfrac{x}{y}\rVert$ |
| Inner product | `\inner{\frac{x}{y}}{\frac{y}{z}}` | $\langle\tfrac{x}{y}, \tfrac{y}{z}\rangle$ | $\langle\dfrac{x}{y}, \dfrac{y}{z}\rangle$ |
| Cardinality | `\card{\whA}` | $\lvert\widehat{A}\rvert$ | $\lvert\widehat{A}\rvert$ |

The norm and inner product commands also have versions with a subscript argument:

| Description | Example | Text style | Display style |
|---|---|---|---|
| Norm with subscript | `\normsub*{\frac{x}{y}}{2}` | $\left\lVert\tfrac{x}{y}\right\rVert_2$ | $\left\lVert\dfrac{x}{y}\right\rVert_2$ |
| Inner product with subscript | `\innersub*{\frac{x}{y}}{z}{2}` | $\left\langle\tfrac{x}{y}, z\right\rangle_2$ | $\left\langle\dfrac{x}{y}, z\right\rangle_2$ |

## 2 $L_p$ Spaces and Operators

| Description | Example | Text style | Display style |
|---|---|---|---|
| $L_p$ space | `\Lp{2}` | $L_2$ | $L_2$ |
| $L_p$ space for specified measure | `\Lpmeas{2}{\hmu}` | $L_2(\hat{\mu})$ | $L_2(\hat{\mu})$ |
| | `\Lpmeas[\Big]{2}{\hmu}` | $L_2\Big(\hat{\mu}\Big)$ | $L_2\Big(\hat{\mu}\Big)$ |
| $L_p$ norm | `\Lpnorm{\hGamma}{2}` | $\Vert\hat{\Gamma}\Vert_{L_2}$ | $\Vert\hat{\Gamma}\Vert_{L_2}$ |
| | `\Lpnorm*{\hGamma}{2}` | $\left\Vert\hat{\Gamma}\right\Vert_{L_2}$ | $\left\Vert\hat{\Gamma}\right\Vert_{L_2}$ |
| | `\Lpnorm*{\Gamma}{2}` | $\left\Vert\Gamma\right\Vert_{L_2}$ | $\left\Vert\Gamma\right\Vert_{L_2}$ |
| | `\left\Vert{\hGamma}\right\Vert_{2}` | $\left\Vert\hat{\Gamma}\right\Vert_{2}$ | $\left\Vert\hat{\Gamma}\right\Vert_{2}$ |
| | `\left\Vert{\Gamma}\right\Vert_{2}` | $\left\Vert\Gamma\right\Vert_{2}$ | $\left\Vert\Gamma\right\Vert_{2}$ |
| $L_p$ norm for specified measure | `\Lpmeasnorm{\hGamma}{2}{\hmu}` | $\Vert\hat{\Gamma}\Vert_{L_2(\hat{\mu})}$ | $\Vert\hat{\Gamma}\Vert_{L_2(\hat{\mu})}$ |
| | `\Lpmeasnorm[\Big]{\hGamma}{2}{\hmu}` | $\Big\Vert\hat{\Gamma}\Big\Vert_{L_2(\hat{\mu})}$ | $\Big\Vert\hat{\Gamma}\Big\Vert_{L_2(\hat{\mu})}$ |
| $L_p$ inner product | `\Lpinner{\hGamma}{\Gamma}{2}` | $\langle\hat{\Gamma},\Gamma\rangle_{L_2}$ | $\langle\hat{\Gamma},\Gamma\rangle_{L_2}$ |
| | `\Lpinner*{\hGamma}{\Gamma}{2}` | $\left\langle\hat{\Gamma},\Gamma\right\rangle_{L_2}$ | $\left\langle\hat{\Gamma},\Gamma\right\rangle_{L_2}$ |
| $L_p$ inner product for specified measure | `\Lpmeasinner{\hGamma}{\Gamma}{2}{\hmu}` | $\langle\hat{\Gamma},\Gamma\rangle_{L_2(\hat{\mu})}$ | $\langle\hat{\Gamma},\Gamma\rangle_{L_2(\hat{\mu})}$ |
| | `\Lpmeasinner[\big]{\hGamma}{\Gamma}{2}{\hmu}` | $\big\langle\hat{\Gamma},\Gamma\big\rangle_{L_2(\hat{\mu})}$ | $\big\langle\hat{\Gamma},\Gamma\big\rangle_{L_2(\hat{\mu})}$ |

# 3 annotation commands

| | |
|---|---|
| `\barA` | $\bar{A}$ |
| `\bara` | $\bar{a}$ |
| `\bA` | $\bar{A}$ |
| `\bB` | $\bar{B}$ |
| `\balpha` | $\bar{\alpha}$ |
| `\bGamma` | $\bar{\Gamma}$ |
| `\mcA` | $\mathcal{A}$ |
| `\hmcA` | $\hat{\mathcal{A}}$ |
| `\mfA` | $\mathfrak{A}$ |
| `\mfa` | $\mathfrak{a}$ |
| `\bmfA` | $\boldsymbol{\mathfrak{A}}$ |
| `\bmfa` | $\boldsymbol{\mathfrak{a}}$ |
| `\hA` | $\hat{A}$ |
| `\ha` | $\hat{a}$ |
| `\halpha` | $\hat{\alpha}$ |
| `\hGamma` | $\hat{\Gamma}$ |
| `\bhA` | $\hat{\mathbf{A}}$ |
| `\bha` | $\hat{\mathbf{a}}$ |
| `\bhalpha` | $\hat{\alpha}$ |
| `\bhGamma` | $\hat{\mathbf{\Gamma}}$ |
| `\whA` | $\widehat{A}$ |
| `\wha` | $\widehat{a}$ |
| `\tdA` | $\tilde{A}$ |
| `\tda` | $\tilde{a}$ |
| `\tdalpha` | $\tilde{\alpha}$ |
| `\tdGamma` | $\tilde{\Gamma}$ |
| `\btdA` | $\tilde{\mathbf{A}}$ |
| `\btda` | $\tilde{\mathbf{a}}$ |
| `\btdalpha` | $\tilde{\alpha}$ |
| `\btdGamma` | $\tilde{\mathbf{\Gamma}}$ |
| `\biA` | $\boldsymbol{A}$ |
| `\bia` | $\boldsymbol{a}$ |
| `\bhiA` | $\hat{\boldsymbol{A}}$ |
| `\bhia` | $\hat{\boldsymbol{a}}$ |

# 4 new approach to annotation commands

Out of the box we can get all sorts of cool fonts in math mode using `\f[<fontcodestring>]A`. For the time being I only implemented 2 fonts and 1 accent. These can be expanded once everything else is set. We see the effect of single font codes:

| | |
|---|---|
| `\f[b]A` | $\mathbf{A}$ |
| `\f[k]A` | $\mathbb{A}$ |
| `\f[h]A` | $\widehat{A}$ |

And multiple font codes:

| | |
|---|---|
| `\f[bh]A` | $\widehat{\mathbf{A}}$ |
| `\f[hb]A` | $\widehat{\mathbf{A}}$ |
| `\f[hk]A` | $\widehat{\mathbb{A}}$ |
| `\f[kh]A` | $\mathbb{A}$ |

Note that these are expanded in the reverse of the order they appear: the font code furthest to the right is applied first. This natches the order that the corresponding commands would appear in TeX code.

We can also avoid typing `[]` for some combinations of font codes we sue frequently. To do this, use `\parsefontstylesstrings{{<fcstr1>},{<fcstr2>},...}{<alphabet>}` as demonstrated below. For "ease of use" we have implemented `\upperCaseRomanLetters` and `\lowerCaseRomanLetters` . .

| | |
|---|---|
| `\parsefontstylesstrings{{hb},{hk}}{ABCDEFG}` | ... |
| `\parsefontstylesstrings{{hb},{hk}}{\lowerCaseRomanLetters}` | ... |
| `\fhbA` | $\widehat{\mathbf{A}}$ |
| `\fhkB` | $\widehat{\mathbb{B}}$ |
| `\fhbx` | $\widehat{\mathbf{x}}$ |
| `\fhby` | $\widehat{\mathbf{y}}$ |
| `\fhkz` | $\widehat{\digamma}$ |

Since `\mathbb<lowercaseletter>` is defined to give weird characters, our macros do the same.