Latex Special Symbols

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Dependencies:

```
\usepackage{mathtools}
\usepackage{bm}
\usepackage{accents}
```

1 Under and Below Hat, Bar and Tilde

Under and below bar, allowing for bold notation for vector.

1.1 Accents Package

Reference:

- SE: bar-below-symbol

- SE: Making hats (and other accents) bold

1.1.1 Accents Package Regular Font

Define:

```
\newcommand{\uhat}[1]{\underaccent{\hat}{#1}}
\newcommand{\ubar}[1]{\underaccent{\bar}{#1}}
\newcommand{\utilde}[1]{\underaccent{\tilde}{#1}}
```

Now write letters with under and over bars etc:

[*]https://fanwangecon.github.io, repository: Tex4Econ

```
\hat{ABC}, \bar{ABC}, \tilde{ABC},
\uhat{ABC}, \ubar{ABC}, \utilde{ABC},
```

$$\hat{a}, \bar{a}, \tilde{a}, \underaccent{\hat}{a}, \underaccent{\bar}{a}, \underaccent{\tilde}{a}, \hat{A}, \bar{A}, \tilde{A}, \underaccent{\hat}{A}, \underaccent{\bar}{A}, \underaccent{\tilde}{A}$$
$$a\hat{b}c, a\bar{b}c, a\tilde{b}c, a\underaccent{\hat}{b}c, a\underaccent{\bar}{b}c, a\underaccent{\tilde}{b}c, A\hat{B}C, A\bar{B}C, A\tilde{B}C, A\underaccent{\hat}{B}C, A\underaccent{\bar}{B}C, A\underaccent{\tilde}{B}C$$
$$\hat{\alpha}, \bar{\alpha}, \tilde{\alpha}, \underaccent{\hat}{\alpha}, \underaccent{\bar}{\alpha}, \underaccent{\tilde}{\alpha}, \hat{\alpha}, \bar{\alpha}, \tilde{\alpha}, \underaccent{\hat}{\alpha}, \underaccent{\bar}{\alpha}, \underaccent{\tilde}{\alpha}$$
$$\alpha\hat{\Gamma}\beta, \alpha\bar{\Gamma}\beta, \alpha\tilde{\Gamma}\beta, \alpha\underaccent{\hat}{\Gamma}\beta, \alpha\underaccent{\bar}{\Gamma}\beta, \alpha\underaccent{\tilde}{\Gamma}\beta, \alpha\hat{\Gamma}\beta, \alpha\bar{\Gamma}\beta, \alpha\tilde{\Gamma}\beta, \alpha\underaccent{\hat}{\Gamma}\beta, \alpha\underaccent{\bar}{\Gamma}\beta, \alpha\underaccent{\tilde}{\Gamma}\beta \tag{1}$$

1.1.2 Accents Package Bold

Define these new commands that combine accent and the bm packages. Note that the accents are defined outside of the bold letters, so accents are not bold. Can not define bold accents with bm directly using the accents package it seems:

```
\newcommand{\hatbm}[1]{\hat{\bm{#1}}}
\newcommand{\barbm}[1]{\bar{\bm{#1}}}
\newcommand{\tildebm}[1]{\tilde{\bm{#1}}}
\newcommand{\uhatbm}[1]{\underaccent{\hat}{\bm{#1}}}
\newcommand{\ubarbm}[1]{\underaccent{\bar}{\bm{#1}}}
\newcommand{\utildebm}[1]{\underaccent{\tilde}{\bm{#1}}}
```

Now write letters with under and over bars etc:

```
\hatbm{ABC}, \barbm{ABC}, \tildebm{ABC},
\uhatbm{ABC}, \ubarbm{ABC}, \utildebm{ABC},
```

$$\hat{\boldsymbol{\Gamma}}, \underaccent{\hat}{\boldsymbol{\Gamma}\boldsymbol{\beta}}$$
$$\bar{\boldsymbol{a}}, \underaccent{\hat}{\boldsymbol{a}}$$
$$\tilde{\boldsymbol{a}}, \underaccent{\bar}{\boldsymbol{a}}$$
$$\hat{\boldsymbol{a}}, \bar{\boldsymbol{a}}, \tilde{\boldsymbol{a}}, \underaccent{\hat}{\boldsymbol{a}}, \underaccent{\bar}{\boldsymbol{a}}, \underaccent{\tilde}{\boldsymbol{a}}, \hat{\boldsymbol{A}}, \bar{\boldsymbol{A}}, \tilde{\boldsymbol{A}}, \underaccent{\hat}{\boldsymbol{A}}, \underaccent{\bar}{\boldsymbol{A}}, \underaccent{\tilde}{\boldsymbol{A}},$$
$$\boldsymbol{a}\hat{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{a}\bar{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{a}\tilde{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{a}\underaccent{\hat}{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{a}\underaccent{\bar}{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{a}\underaccent{\tilde}{\boldsymbol{b}}\boldsymbol{c}, \boldsymbol{A}\hat{\boldsymbol{B}}\boldsymbol{C}, \boldsymbol{A}\bar{\boldsymbol{B}}\boldsymbol{C}, \boldsymbol{A}\tilde{\boldsymbol{B}}\boldsymbol{C}, \boldsymbol{A}\underaccent{\hat}{\boldsymbol{B}}\boldsymbol{C}, \boldsymbol{A}\underaccent{\bar}{\boldsymbol{B}}\boldsymbol{C}, \boldsymbol{A}\underaccent{\tilde}{\boldsymbol{B}}\boldsymbol{C},$$
$$\hat{\boldsymbol{\alpha}}, \bar{\boldsymbol{\alpha}}, \tilde{\boldsymbol{\alpha}}, \underaccent{\hat}{\boldsymbol{\alpha}}, \underaccent{\bar}{\boldsymbol{\alpha}}, \underaccent{\tilde}{\boldsymbol{\alpha}}, \hat{\boldsymbol{\alpha}}, \bar{\boldsymbol{\alpha}}, \tilde{\boldsymbol{\alpha}}, \underaccent{\hat}{\boldsymbol{\alpha}}, \underaccent{\bar}{\boldsymbol{\alpha}}, \underaccent{\tilde}{\boldsymbol{\alpha}}$$
$$\boldsymbol{\alpha}\hat{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\bar{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\tilde{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\hat}{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\bar}{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\tilde}{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\hat{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\bar{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\tilde{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\hat}{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\bar}{\boldsymbol{\Gamma}}\boldsymbol{\beta}, \boldsymbol{\alpha}\underaccent{\tilde}{\boldsymbol{\Gamma}}\boldsymbol{\beta} \tag{2}$$

1.1.3 Mathcal and Accents

```
\bar{\mathcal{Q}^{C}}, \ubar{\mathcal{Q}^{C}},
\barbm{\mathcal{Q}^{C}}, \ubarbm{\mathcal{Q}^{C}}
```

$$\bar{\mathcal{A}}, \underaccent{\bar}{\mathcal{A}}, \bar{\boldsymbol{\mathcal{A}}}, \boldsymbol{\mathcal{A}}$$
$$\bar{\mathcal{Q}}^{C}, \underaccent{\bar}{\mathcal{Q}}^{C}, \bar{\boldsymbol{\mathcal{Q}}}^{C}, \boldsymbol{\mathcal{Q}}^{C}$$
$$\tilde{\mathcal{A}}, \underaccent{\tilde}{\mathcal{A}}, \tilde{\boldsymbol{\mathcal{A}}}, \underaccent{\tilde}{\boldsymbol{\mathcal{A}}}$$
$$\tilde{\mathcal{Q}}^{C}, \underaccent{\tilde}{\mathcal{Q}}^{C}, \tilde{\boldsymbol{\mathcal{Q}}}^{C}, \underaccent{\tilde}{\boldsymbol{\mathcal{Q}}}^{C}$$

$$(3)$$

1.1.4 bm and Underline and Overline

Rather than using bar and under bar that are fixed width, use underline and overline which change width and can change in boldness.

```
\newcommand{\overlinebm}[1]{\bm{\overline{#1}}}
\newcommand{\underlinebm}[1]{\bm{\underline{#1}}}

\bar{\mathcal{Q}^{C}}, \ubar{\mathcal{Q}^{C}},
\barbm{\mathcal{Q}^{C}}, \ubarbm{\mathcal{Q}^{C}}
```

$$\overline{\mathcal{Q}^{C}}, \underline{\boldsymbol{\mathcal{Q}}^{C}}, \overline{\boldsymbol{\mathcal{ABC}}^{C}}, \underline{\boldsymbol{\mathcal{ABC}}^{C}}$$
$$\overline{\alpha\Gamma\beta}, \underline{\boldsymbol{\alpha\Gamma\beta}}$$

$$(4)$$