Classroom Tips and Techniques: Notational Simplification with the alias Command

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Introduction

In this month's article, we report on our experiences learning how to alias symbols to the **laplace** and **invlaplace** commands.

The alias Command

The **alias** command links a Maple command with a new name. For example, to link the **PolynomialInterpolation** command (from the *CurveFitting* package) to the shorter "interp," execute the command

$$alias(interp = PolynomialInterpolation)$$

Then, instead of typing the longer name, simply type "interp" in its place.

The Laplace transform of $y(t)$ is obtained in Maple with the command

$$laplace(y(t), t, s)$$

When taking the Laplace transform of a differential equation in $y(t)$, it is possible to have the transform of $y(t)$ echo back in Maple as, for example, Y, by executing the following **alias** command.

$$alias(Y = laplace(y(t), t, s))$$

The result that contains the symbol Y is much easier to read than the result containing multiple copies of the string $laplace(y(t), t, s)$.

Aliasing a Symbol for the Laplace Operator

It is common in the literature to use a symbol such as $\mathcal{L}$ for the Laplace transform operator. Indeed, the Maple operator $laplace(y(t), t, s)$ is easier to comprehend if it appears as $\mathcal{L}(y(t), t, s)$. In Math mode, the symbol $\mathcal{L}$ is aliased to the **laplace** operator by executing the command

$$alias(\mathcal{L} = laplace)$$

or

$$alias(\mathcal{L} = inttrans[laplace])$$

to avoid the need to load the *inttrans* package, the home of the **laplace** and **invlaplace** commands.

The symbol $\mathcal{L}$ is obtained from either the Script palette or the Constants and Symbols palette. Simply select the symbol from the appropriate palette.

Table 1 demonstrates the effect of these notational simplifications.

☐ Establish aliases.	$alias(Y = laplace(y(t), t, s), \mathcal{L}$ $\qquad = inttrans[laplace])$:
☐ Test the aliases.	$\mathcal{L}(y(t), t, s)$ $\qquad\qquad\qquad\qquad Y$

Table 1   Illustration of aliases for the Laplace transform operator

To hide the **alias** command behind a component button where all data entry is in text mode, the typeset name of the symbol is needed. To discover that name, follow the steps in Table 2.

☐ Enter the symbol $\mathcal{L}$ from the Script (or Constants and Symbols) palette. Press Enter.	$\mathcal{L}$ $\qquad\qquad \mathcal{L}$
☐ Execute the **lprint** command as shown. Use the equation label to reference the echoed $\mathcal{L}$.	$lprint(\mathbf{(3.1)})$ `` `ℒ` ``

Table 2   Steps to determine the "name" of the symbol $\mathcal{L}$

The name to be used in the **alias** command is then the string `` `ℒ` ``, which can be

copied and pasted. Figure 1 shows how to enter the alias command in the text mode that is the only option in the Edit field of a Button component.
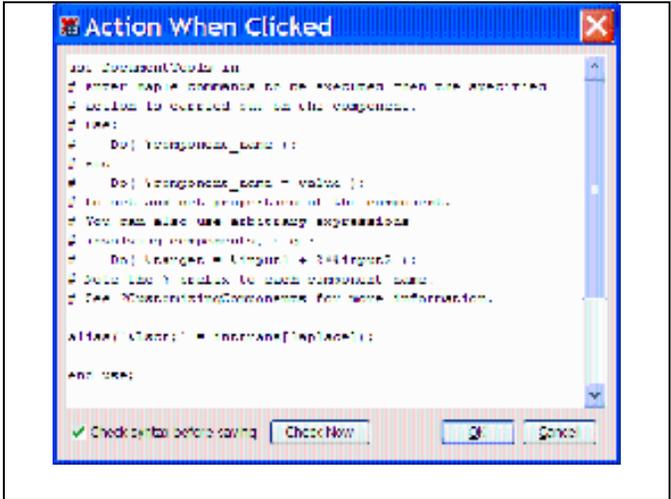
Figure 1   Text-mode entry of the alias command in the Edit field of a Button component
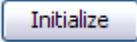
Aliasing a Symbol for the Inverse Transform Operator

Having successfully aliased the **laplace** command to the symbol $\mathcal{L}$, it is natural to try aliasing the **invlaplace** command to the symbol $\mathcal{L}^{-1}$. Indeed, this can also be done, with one proviso. In the command

$$alias\left(\mathcal{L}^{-1} = inttrans\left[invlaplace\right]\right)$$

the whole symbol $\mathcal{L}^{-1}$ must be selected and converted to "Atomic Identifier" form. This is done by using the Context Menu (2-D Math/Convert To/Atomic Identifier) or the Format menu (Convert To/Atomic Identfier).

To hide this alias inside a Button component where all data is entered in text mode, the "name" of the symbol is required. The steps in Table 2 do not suffice. The additional step of conversion to Atomic Identifier is required. After the symbol $\mathcal{L}^{-1}$ is entered, and before the Enter key is pressed, the whole symbol must be converted to "Atomic Identifier" form. Once this conversion has been made, press Enter as in Step (1) in Table 2. As in Step (2) of Table 2, use the **lprint** command to discover the string that represents the symbol $\mathcal{L}^{-1}$. These steps are captured in Table 3, but there is no visual evidence that $\mathcal{L}^{-1}$ has been fused into a single symbol by conversion to Atomic Identifier form.

☐ Enter $\mathcal{L}^{-1}$ and convert to Atomic Identifier form.	$\mathcal{L}^{-1}$ $\mathcal{L}^{-1}$
☐ Execute the **lprint** command as shown.	$lprint((\textbf{4.1}))$ `` `#msup(mi("ℒ"),mrow(mo("&uminus0;"),m n("1")))` ``

Table 3   Determination of the "name" of the symbol $\mathcal{L}^{-1}$

We have installed the desired alias behind the component button [Initialize] . The code can be seen with Context Menu: Component Properties for the button. Select the Edit field corresponding to "Action When Clicked."

Click the button, and test its effect as per Table 4.

Apply the $\mathcal{L}^{-1}$ operator. Be sure to convert it to Atomic Identifier!	$\mathcal{L}^{-1}(Y, s, t)$ $y(t)$

Table 4   Application of the operator $\mathcal{L}^{-1}$

As per Table 4, application of the operator $\mathcal{L}^{-1}$ requires that the symbol be converted to Atomic Identifier each time it is used as an operator.