

Product Review Clarifications

*Bela Palancz, Zoltan Benyo,
and Levente Kovacs*

We wish to clarify some misleading statements in the product review “Control Systems Professional Suite,” which appeared in the April 2005 issue of *IEEE Control Systems Magazine*, vol. 25, pp. 67–75.

In the section “Linearization of the Model,” on p. 68, the description of the S function may give the false impression that linearization is a cumbersome process. On the contrary, MATLAB provides a template file (toolbox\simulink\blocks\ja\sfuntmpl.m) that the user needs to modify in only three places. Besides these changes, a nonlinear model can be built up with Simulink interactively and then linearized. However, for complex systems the construction of the block diagram may be time consuming. Nevertheless, linearization in Mathematica, even in symbolic form, needs only one function call, without any preparation.

In the section “Control Object Representation,” on p. 69, Out[12] may be surprising since this realization is non-minimal. To obtain a minimal realization

```
Unprotect[Conjugate]; Conjugate[%_] := %;
MinimalRealization[ControlObjectTF]//Simplify//
EquationForm
```

$$x = \left(-\frac{c0}{2A\sqrt{h0}} \right) x + \left(\frac{1}{\sqrt{h0+1}} - \sqrt{\frac{h0}{h0+1}} \right) u$$

$$y = \left(\frac{\sqrt{h0+1}}{A} \right) x.$$

To obtain the original minimal realization Out[8], one can

introduce the new state variable

$$\bar{x} = \frac{\sqrt{h0+1}}{A} x.$$

In the section “Control Design in State Space,” on p. 71, concerning Out[25], we did not intend to compare the two controller types. The case $p2 = 0$ emphasizes the universality of the mathematical formula.

In the section “Design of the Optimal Controller,” on p. 72, for checking controllability of the system (Out[31]), insert above In[32]

For a *first-order* controllable system, ...

In this case $n = 1$ and rank $A = n$.

In the section “Conclusions,” on p. 75, the last paragraph reads:

“In our experience, Mathematica’s CSPS has advantages for education and research, particularly for *developing new control formulas*. It is especially useful in real-time application, where fast evaluation is important, whereas MATLAB has advantages for *numerical engineering applications*.”

Here the pronoun “It” stands for *developing new control formulas*, rather than Mathematica, which has nothing to do with real time.

It goes without saying that MATLAB has good toolboxes for real-time applications as well as many different script-files and toolboxes. However, for symbolic solutions, there are better choices.

We thank Martin Hromcik and Zdenek Hurak for bringing these points to our attention.