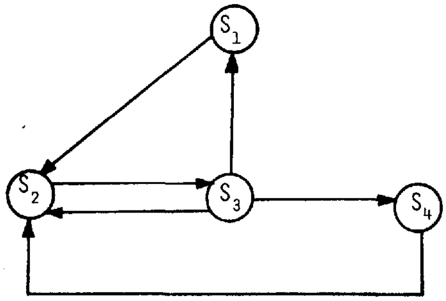
LETTERS TO THE EDITOR

TO THE EDITOR

In a recent article by Pho and Lapidus (1973), the authors utilize signal flow diagrams (where streams are represented by nodes) in the course of decomposition of process flow diagrams (where process units are represented by nodes and streams by edges). However, the example chosen to illustrate reduction of a signal flow diagram (Figure 3, here reproduced with its associated loop matrix as Figure 1) corre-



(A)

	S_1	S_2	S_3	S_4
l_1		1	1	
l_2	1	1	1	
l_3		1	1	1

(B)

Fig. 1. An example of unrealizable signal flow diagram and loop matrix.

sponds to no realizable process flow diagram. The reduction procedure illustrated is valid, but the example is not meaningful in the context of process flow diagram. In a process flow diagram, a stream is a simple, unidirectional connection between two units. Since S_3 leads into S_1 and into S_2, the latter two must be output of a unit to which S_3 is an input. However, since S_2 and S_1 are part of loop 2 (Figure 1B), they cannot both be outputs of the same unit. Thus, S_1 cannot be an output of the unit to which S_3 is an input. This contradicts the earlier argument that S_1 must be an output of such a unit. A similar contradiction arises when one considers S_4 instead of S_1. Thus the signal flow diagram is not associated with any system of units and connecting streams.

Furthermore, the accompanying loop matrix, shown in Figure 1B, is also inconsistent with the characteristics of loop matrices derived from process flow diagrams. It can be shown that no row of a loop matrix can contain any other row (that is, it cannot have all the entries of any other row). This follows from the definition of simple loops. It might be noted that for a system with 4 streams, there are at most two loops of length two or more, whereas the signal flow diagram presented by the authors shows three such loops.

This all might warn of possible dangers in working with signal flow diagrams unless they are carefully checked for correspondence with the configuration of the process in question.

LITERATURE CITED

Pho, T. K., and L. Lapidus, "An Optimum Tearing Algorithm for Recycle Systems," *AIChE J.*, 19, 1170 (1973).

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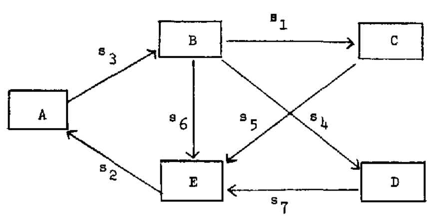
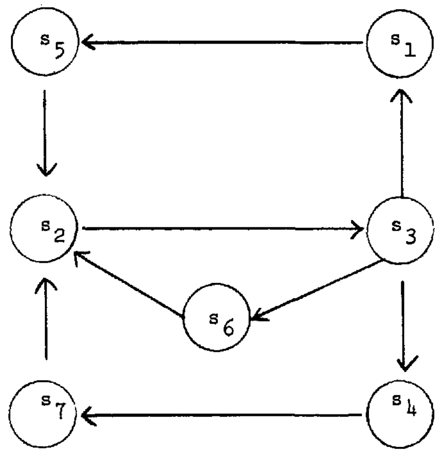
TO THE EDITOR: COMMENTS ON THE LETTER TO THE EDITOR BY R. UPADHYE

While it is true that the example illustrated as Figure 3 in the paper by Pho-Lapidus is unrealizable in terms of conversion to a real process flow diagram, this in no way detracts from the paper. Such signal flow diagrams are often the result of repeated reductions of an initial flow diagram by tearing algorithms such as those proposed in the paper. Consequently, the example shown is not limited only to a realizable signal flow diagram. Further, we must point out that the initial flow diagram from which we began our algorithm is process realizable since it was derived directly from an original process flow diagram. Because we are only interested in locating an optimum torn set, the realizability of a reduced signal flow diagram from the initial graph is largely immaterial.

To illustrate this point further consider the process flow diagram:



Its initial signal flow diagram can be shown to be



If we declare stream nodes s_5, s_6, and s_7 as being ineligible, the signal flow diagram of Figure 3 will result.

Obviously the above demonstrates how an unrealizable signal flow diagram can be derived from its initial realizable graph.

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ERRATA (continued)

In "On the Maximum Temperature Rise in Gas-Solid Reactions" by H. Y. Sohn [*AIChE J.*, 19, 191 (1973)], the following corrections should be made:

1. The definition of A given by Equation (7) should read

$$A \equiv \frac{C_B h\, F_p}{\rho_s C_s D_e n C_A} \left(\frac{F_p V_p}{A_p} \right)$$

where F_p is a shape factor which has the value of 1, 2, or 3, respectively, for an infinite slab, an infinite cylinder, or a sphere. It is further noted that

$$\frac{F_p V_p}{A_p} = a$$

The computed results remain applicable for the new definition of A, and thus for all three basic geometries (F_p = 1, 2, and 3). Furthermore, the results are also expected to be approximately valid for pellet geometries other than the three basic ones, if a proper value of F_p is used.

2. Equation (13) should read

$$e^{-\omega^2} \cdot D(\omega) = \dots\dots$$

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