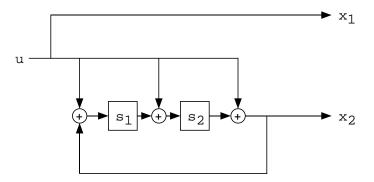EE/Ma 127b Error-Correcting Codes   R. J. McEliece
draft of February 28, 2001   162 Moore
<div align="center">Homework Assignment 4 **Final Version**

Due 9am March 2, 2001</div>

Reading: Johannesson and Zigangirov, Section 1.3, pp. 16–21.
RJM "Chapter 12: The Algebraic Theory of Convolutional Codes",
Section 2, pp. 1068–1077.
Wicker, Chapter 12, Secs. 12.1, 12.2, 12.4

Problems to Hand In:

Problem 1. Consider the following convolutional encoder:

(a) Find an equivalent "state-space" (A, B, C, D) representation.

(b) Using the state-space representation found in part (a), find the corresponding generator matrix.

(c) Find the "impulse response," i.e., the output if the input is $(1, 0, 0, 0, 0, 0, \ldots)$.

Problem 2. Johannesson and Zigangirov, Problem 1.27 (p. 30). And *add* the following problem before part (a):

(a') Draw the state diagram.

Also *replace* part (b) with

(b') Find the generator matrix $G(D)$ and the "scalar" generator matrix G_{scalar} dscussed in class on Feb. 21. (J. & Z. call G_{scalar} the generator matrix on p. 17.)

Problem 3. Wicker, Problems 12.3 and 12.4 (p. 331).

Problem 4. Wicker, Problems 12.8 and 12.9 (p. 332).