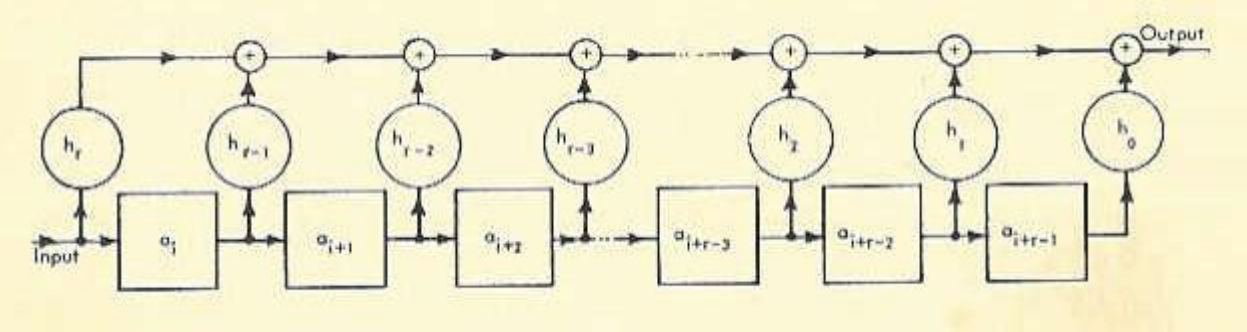
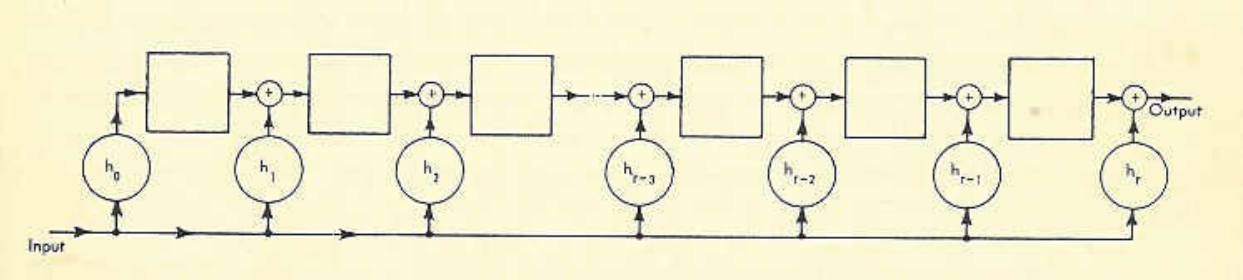
Handout
for
CMSC 442/653 Introduction to Coding Theory
Instructor: Dr. Lomonaco

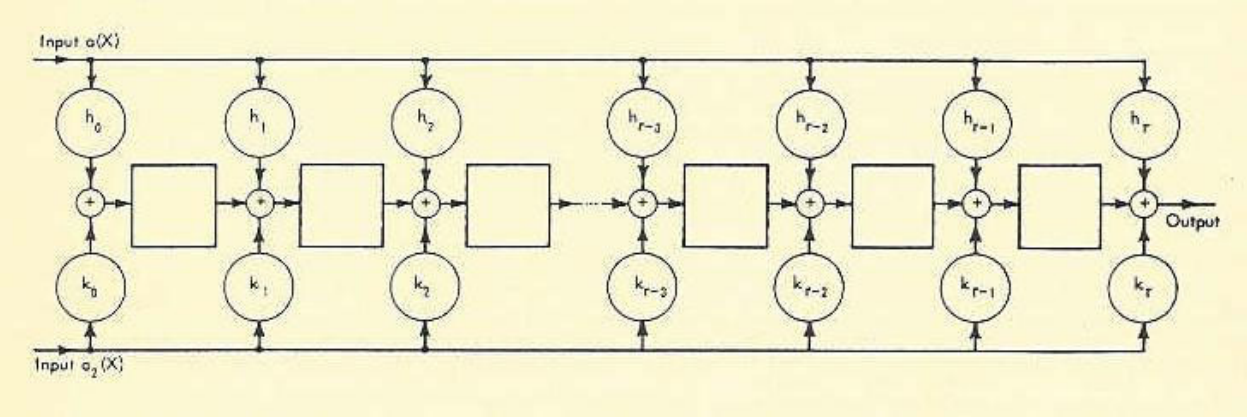
Templates for Linear Sequential Circuits



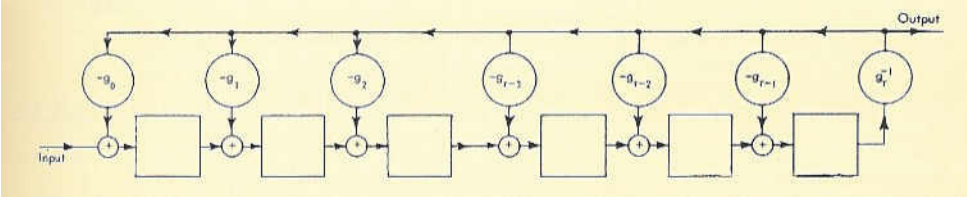
First template for multiplication by $h(x) = h_0 + h_1 x + h_2 x^2 + \cdots + h_r x^r$



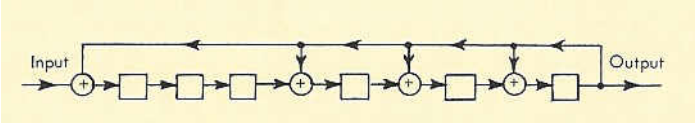
Second template for multiplication by $h(x) = h_0 + h_1 x + h_2 x^2 + \cdots + h_r x^r$



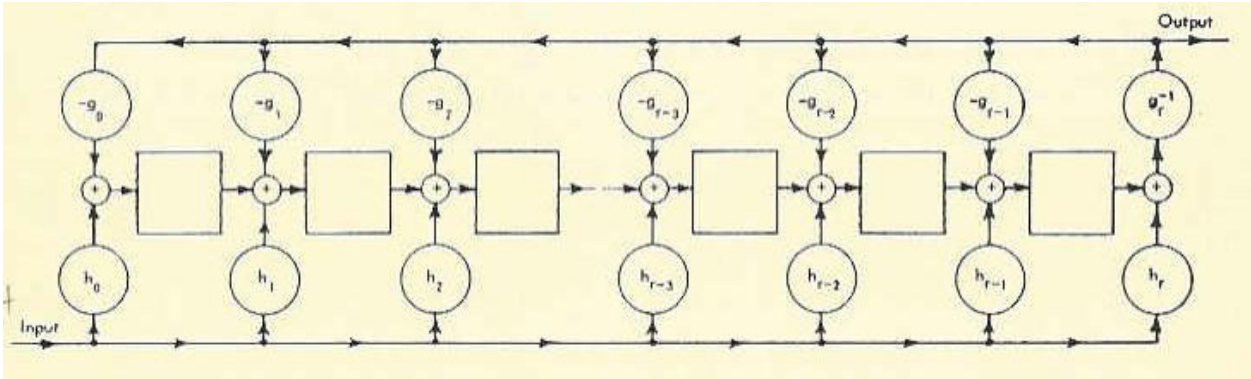
Template for multiplication by $h(x)$ and $k(x)$



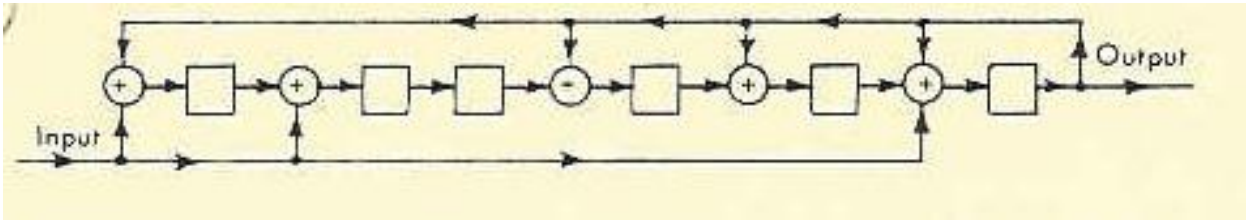
Template for division by $g(x) = g_0 + g_1 x + g_2 x^2 + \cdots + g_r x^r$



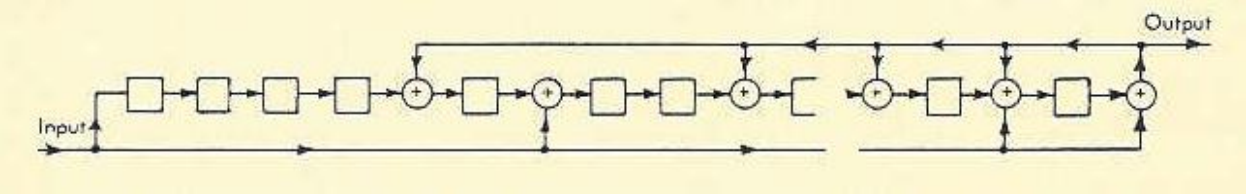
Example of a LSC that divides by $1 + x^3 + x^4 + x^5 + x^6$



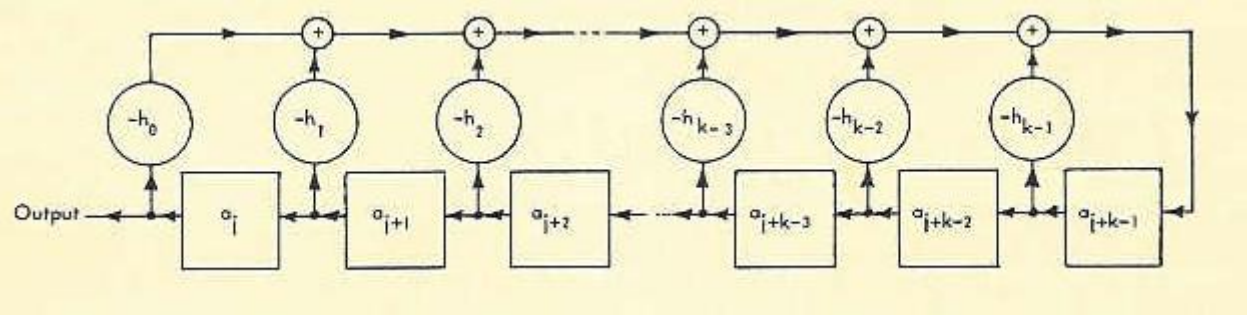
A template for a LSC that simultaneauly multiplies by $h(x) = h_0 + h_1 x + h_2 x^2 + \cdots + h_r x^r$ and divides by $g(x) = g_0 + g_1 x + g_2 x^2 + \cdots + g_r x^r$



An example with $\deg(g) \geq \deg(h)$ of a LSC that simultaneously multiplies by $h(x) = 1 + x + x^5$ and divides by $g(x) = 1 + x^3 + x^4 + x^5 + x^6$. **Observation:** If $\deg(g) \geq \deg(h)$, then start on left.



An example with $\deg(g) < \deg(h)$ of a LSC that simultaneously multiplies by $h(x) = 1 + x^5 + x^9 + X^{10}$ and divides by $g(x) = 1 + x^3 + x^4 + x^5 + x^6$. **Observation:** If $\deg(g) < \deg(h)$, then start from right.



A shift register generator based on the polynomial $h(x) = h_0 + h_1 x + h_2 x^2 + \cdots + h_k x^k$.