Synthesis lattice

A. Gray and J. Markel, "Digital Lattice and Ladder Filter Synthesis," IEEE Trans. Audio & Electroacoustics, AU-21 : 491-500 (1973)

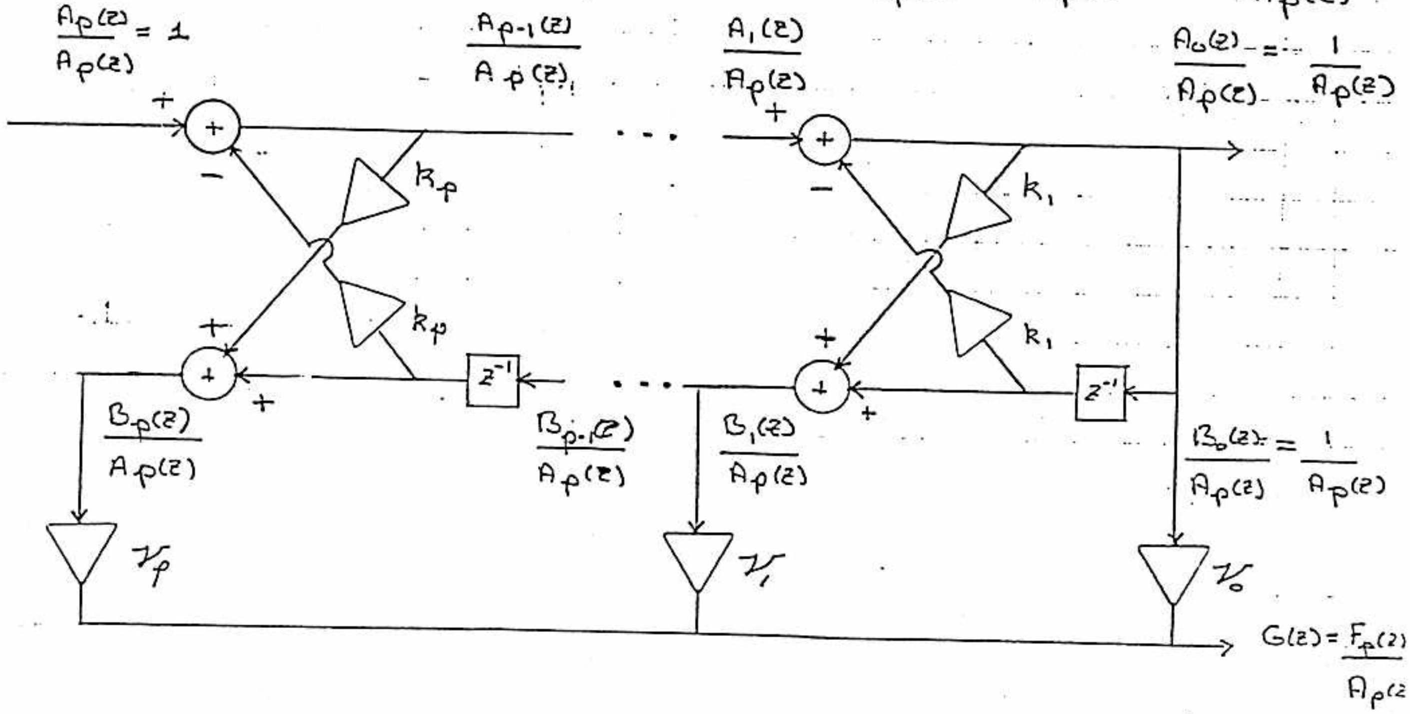
$$A_{i-1}(z) = A_i(z) - K_i z^{-1} B_{i-1}(z)$$

$$z^{-1} B_{i-1}(z) = B_i(z) - K_i A_{i-1}(z)$$

$\longrightarrow$

$$\frac{A_{i-1}(z)}{A_p(z)} = \frac{A_i(z)}{A_p(z)} - K_i z^{-1} \frac{B_{i-1}(z)}{A_p(z)}$$

$$\frac{z^{-1} B_{i-1}(z)}{A_p(z)} = \frac{B_i(z)}{A_p(z)} - K_i \frac{A_{i-1}(z)}{A_p(z)}$$



$$G(z) = \frac{F_p(z)}{A_p(z)}$$

where: $F_i(z) = \sum_{k=0}^{i} f_k^{(i)} z^{-k}$; $A_i(z) = \sum_{k=0}^{i} a_k^{(i)} z^{-k}$, $a_0^{(i)} = 1$

let $\nu_i = f_i^{(i)}$

$$F_{i-1}(z) = F_i(z) - \nu_i B_i(z)$$

for $i = p, p-1, \ldots, 1$ with $\nu_0 = f_0^{(0)}$.

thus $F_p(z) = \sum_{i=0}^{p} \nu_i B_i(z)$

and $G(z) = \sum_{i=0}^{p} \nu_i \frac{B_i(z)}{A_p(z)}$