We take all pole lattice filter input as

$$x(n) = f_N(n) \quad \text{——— (5)}$$

& output as

$$y(n) = f_0(n) \quad \text{——— (6)}$$

these are exactly opposite of the definition for all zero (FIR) lattice filter.

For $N=1$, the equ^n (3) reduces to

$$y(n) = x(n) - a_1(1)\, y(n-1) \quad \text{——— (7)}$$

where $K_1 = a_1(1)$

The output can also be obtained from single stage lattice filter shown in fig(2) from which

$$\left.\begin{aligned} x(n) &= f_1(n) \\ f_0(n) &= f_1(n) - K_1 g_0(n-1) \\ g_1(n) &= K_1 f_0(n) + g_0(n-1) \\ y(n) &= f_0(n) \\ &= x(n) - K_1 y(n-1) \end{aligned}\right\} \quad \text{(8)}$$

The eq^n for $g_1(n)$ can be expressed as

$$g_1(n) = K_1 y(n) + y(n-1) \quad \text{——— (9)}$$

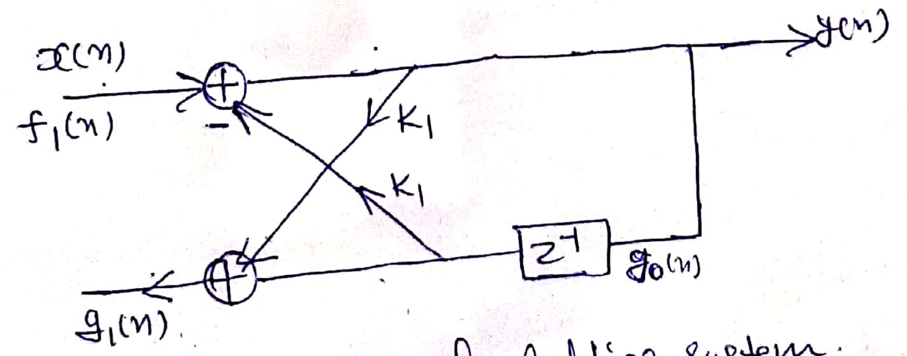

fig:2 Single pole lattice system.

Note → The all-pole lattice structure is stable system if and only if its parameters $|K_m| < 1$ for all m.

⇒ The practical application the all-pole lattice structure has been used to model human vocal tract & a stratified earth. The lattice parameter (K_m) have physical significance of being identical to reflection in physical. it is also called as reflection coefficient.