**Example 10-1:** As a first step toward understanding the general form given in (**??**), consider the first-order case where $M = N = 1$, that is,

$$y[n] = a_1 y[n-1] + \underbrace{b_0 x[n] + b_1 x[n-1]}_{v[n]} \tag{10.1}$$

The block diagram representation of this difference equation, which is shown in Fig. **??**, is constructed by noting that the signal $v[n] = b_0 x[n] + b_1 x[n-1]$ is computed by the left half of the diagram, and we "close the loop" by computing $a_1 y[n-1]$ from the delayed output and adding it to $v[n]$ to produce the output $y[n]$. In the diagram of Fig. **??**, all the paths in the *feed-forward* section go left-to-right, which is forward from the input to the output; in the *feedback* section, the path through the delay goes right-to-left which is from the output back to the input.

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