

9.9 The outputs of the last two adaptors are computed using vector-multipliers. The outputs of the filter are then obtained by a bit-serial addition and subtraction of these values. The simplified implementation is shown below. This scheme reduces the number of terms in the two inner products, u_{34} and u_{54} , at the small expense of two adders.

The new set of difference equations is

$$\begin{aligned}
 v_1(n+1) &:= [1123 x(n) + 99 v_2(n)] 2^{-10} \\
 v_3(n+1) &:= [1405 v_0(n) + 381 v_4(n)] 2^{-10} \\
 v_5(n+1) &:= [-53361 x(n) + 1598577 v_2(n) + 1545216 v_6(n)] 2^{-21} \\
 v_0(n+1) &:= x(n) \\
 u_{34}(n) &:= [381 v_0(n) + 1405 v_4(n)] 2^{-10} \\
 u_{54}(n) &:= [-149391 x(n) + 1694607 v_2(n) + 551936 v_6(n)] 2^{-21} \\
 y_1(n) &:= u_{34}(n) + u_{54}(n) \\
 y_2(n) &:= u_{34}(n) - u_{54}(n)
 \end{aligned}$$

