5.11 The input is assumed to be scaled. The first critical node is after the first adder. The impulse response to this node is

$0.4, –0.4, 0, \ldots \Rightarrow S = 0.8$

$\Rightarrow$ Increase the coefficients by a factor $1/S$ to 0.5 and –0.5, respectively. The impulse response to the output node is (with the two first coefficients scaled):.

$(0.5 \cdot 0.75), (0.5\,(–0.75)) + (–0.5)\,0.75), (–0.5)(–0.75), 0, 0 \ldots =$

$= 0.375, –0.75, 0.375, 0, 0 \Rightarrow S = 1.5$

$\Rightarrow$ Decrease the coefficients by multiplying with a factor $1/S$. We obtain the new values 0.5 and –0.5, respectively. The new scaled impulse response becomes

$(0.5 \cdot 0.5), (0.5\,(–0.5)) + (–0.5)\,0.5), (–0.5)(–0.5), 0\ldots =$

$= 0.25, –0.5, 0.25, 0\ldots$

Using L_∞-norm scaling we get the transfer function to the first critical noise node: $H(z) = 0.4(1 - z^{-1})$. The maximal value of the magnitude function is gotten for $z = –1$. Hence, $|H|_{max} = 0.8$. Thus, increase the first two coefficients to 0.5. The transfer function to the output node is

$$H(z) = 0.5(1 - z^{-1})\,0.75(1 - z^{-1})$$

The maximal value of the magnitude function is occur for $z = –1$. Hence, $|H|_{max} = 1.5$. Thus, decrease the last two coefficients to 0.5. In this case, the two scaling criteria leads to the same coefficients.