In[1]:=
$$\text{SecondOrderAllPass} = \frac{s^2 - \frac{W}{Q} s + W^2}{s^2 + \frac{W}{Q} s + W^2}$$

Out[1]=
$$\frac{s^2 - \frac{s W}{Q} + W^2}{s^2 + \frac{s W}{Q} + W^2}$$

In[2]:=
$$s = P \frac{z - 1}{z + 1}$$

Out[2]=
$$\frac{P (-1 + z)}{1 + z}$$

In[3]:=
$$\text{SecondOrderAllPass}$$

Out[3]=
$$\frac{W^2 + \frac{P^2 (-1+z)^2}{(1+z)^2} - \frac{P W (-1+z)}{Q (1+z)}}{W^2 + \frac{P^2 (-1+z)^2}{(1+z)^2} + \frac{P W (-1+z)}{Q (1+z)}}$$

In[4]:=
$$\text{Together}[\text{ExpandAll}[\%]]$$

Out[4]=
$$\frac{P^2 Q + P W + Q W^2 - 2 P^2 Q z + 2 Q W^2 z + P^2 Q z^2 - P W z^2 + Q W^2 z^2}{P^2 Q - P W + Q W^2 - 2 P^2 Q z + 2 Q W^2 z + P^2 Q z^2 + P W z^2 + Q W^2 z^2}$$

In[5]:=
$$\text{Collect}[\text{Numerator}[\%4], z]$$

Out[5]=
$$P^2 Q + P W + Q W^2 + (-2 P^2 Q + 2 Q W^2) z + (P^2 Q - P W + Q W^2) z^2$$

In[10]:=
$$\text{Collect}[\text{Denominator}[\%4], z]$$

Out[10]=
$$P^2 Q - P W + Q W^2 + (-2 P^2 Q + 2 Q W^2) z + (P^2 Q + P W + Q W^2) z^2$$

In[11]:=
$$\text{Collect}[\%5 / (P^2 Q + P W + Q W^2), z]$$

Out[11]=
$$1 + \frac{(-2 P^2 Q + 2 Q W^2) z}{P^2 Q + P W + Q W^2} + \frac{(P^2 Q - P W + Q W^2) z^2}{P^2 Q + P W + Q W^2}$$

In[12]:=
$$\text{Collect}[\%10 / (P^2 Q + P W + Q W^2), z]$$

Out[12]=
$$\frac{P^2 Q - P W + Q W^2}{P^2 Q + P W + Q W^2} + \frac{(-2 P^2 Q + 2 Q W^2) z}{P^2 Q + P W + Q W^2} + z^2$$