These are the equations to solve for the four coefficients in Caughy 3rd damping from the 3 natural frequencies.
Natural frequencies are obtained from the eigen-solver in ESSI.
User can define the ξ by themselves.

In[1]:=
```
ξ = 0.2;
w1 = 2 Pi * 0.407108;
w2 = 2 Pi * 0.552311;
w3 = 2 Pi * 1.6776;
```

In[5]:=
```
Solve[
 {ξ == a0 / 2 / w1 + a1 / 2 * w1 + a2 / 2 * w1^3 , ξ == a0 / 2 / w2 + a1 / 2 * w2 + a2 / 2 * w2^3 ,
  ξ == a0 / 2 / w3 + a1 / 2 * w3 + a2 / 2 * w3^3}, {a0, a1, a2}]
```

Out[5]=
```
{{a0 → 0.560523, a1 → 0.0730746, a2 → -0.000361559}}
```