```
syms ZR1 ZR2 ZL
```

```
Ze = 1 / (1 / ZR2 + 1 / ZL)
```

Ze =

$$\frac{1}{\frac{1}{\mathrm{ZL}}+\frac{1}{\mathrm{ZR}_2}}$$

```
Z = Ze / (ZR1 + Ze)
```

Z =

$$\frac{1}{\left(\frac{1}{\mathrm{ZL}}+\frac{1}{\mathrm{ZR}_2}\right)\left(\mathrm{ZR}_1+\frac{1}{\frac{1}{\mathrm{ZL}}+\frac{1}{\mathrm{ZR}_2}}\right)}$$

```
syms R1 R2 L w real
```

```
Z = subs(Z, ZR1, R1)
```

Z =

$$\frac{1}{\left(\frac{1}{\mathrm{ZL}}+\frac{1}{\mathrm{ZR}_2}\right)\left(R_1+\frac{1}{\frac{1}{\mathrm{ZL}}+\frac{1}{\mathrm{ZR}_2}}\right)}$$

```
Z = subs(Z, ZR2, R2)
```

Z =

$$\frac{1}{\left(\frac{1}{R_2}+\frac{1}{\mathrm{ZL}}\right)\left(R_1+\frac{1}{\frac{1}{R_2}+\frac{1}{\mathrm{ZL}}}\right)}$$

```
Z = subs(Z, ZL, i * w * L)
```

Z =

$$\frac{1}{\left(R_1+\frac{1}{\frac{1}{R_2}-\frac{\mathrm{i}}{L\,w}}\right)\left(\frac{1}{R_2}-\frac{\mathrm{i}}{L\,w}\right)}$$

```
a = simplify(real(Z))
```

a =

$$\frac{L^2 R_2 w^2 (R_1 + R_2)}{L^2 {R_1}^2 w^2 + 2 L^2 R_1 R_2 w^2 + L^2 {R_2}^2 w^2 + {R_1}^2 {R_2}^2}$$

```
b = simplify(imag(Z))
```

```
b =
```

$$\frac{L R_1 {R_2}^2 w}{L^2 {R_1}^2 w^2 + 2 L^2 R_1 R_2 w^2 + L^2 {R_2}^2 w^2 + {R_1}^2 {R_2}^2}$$

```
b/a
```

```
ans =
```

$$\frac{R_1 R_2}{L w (R_1 + R_2)}$$