

## 1 INPUT

$$A_r, A_i i, B_r, B_i$$

## 2 FORMULA

$$y_r + y_i i = (A_r + A_i i)(x_r + x_i i) + B_r + B_i i$$

## 3 YR

$$y_r = (A_r + A_i i)(x_r + x_i i) + B_r + B_i i - y_i i$$

## 4 YI

$$y_i = \frac{(A_r + A_i i)(x_r + x_i i) + B_r + B_i i - y_r}{i}$$

## 5 XR

$$x_r = \frac{y_r + y_i i - (A_r + A_i i)(x_i i) - B_r - B_i i}{A_r + A_i i}$$

## 6 XI

$$x_i = \frac{y_r + y_i i - (A_r + A_i i)(x_r) - B_r - B_i i}{A_r + A_i i}$$

## 7 abc

$$y_r = (A_r + A_i i)(x_r + x_i i) + B_r + B_i i - y_i i$$

**7.1**  $x_r = 0, x_i = 0, y_i = 0$

$$y_r = (A_r + A_i i)(0 + 0) + B_r + B_i i - 0i = B_r + B_i i = B_r$$

**7.2**  $x_r = 1, x_i = 0, y_i = 0$

$$y_r = (A_r + A_i i)(1 + 0i) + B_r + B_i i - 0i = A_r + A_i i + B_r + B_i i = A_r + B_r$$

**7.3**  $x_r = 0, x_i = 1, y_i = 0$

$$y_r = (A_r + A_i i)(0 + i) + B_r + B_i i - 0i = A_r i - A_i + B_r + B_i i = B_r - A_i$$

## 8 abc2

$$8.1 \quad x_r = 0, x_i = 0, y_r = 0$$

$$y_i = -B_r + B_i$$

$$8.2 \quad x_r = 1, x_i = 0, y_r = 0$$

$$y_i = -A_r + A_i - B_r + B_i$$

$$8.3 \quad x_r = 0, x_i = 1, y_r = 0$$

$$y_i = A_r + A_i - B_r + B_i$$

$$8.3.1 \quad Ax + By + Cz + D = 0$$

$$\begin{vmatrix} x - x_0 & x_1 - x_0 & x_2 - x_0 \\ y - y_0 & y_1 - y_0 & x_2 - x_0 \\ z - z_0 & z_1 - x_0 & x_2 - x_0 \end{vmatrix}$$

$$x = x_r$$

$$y = y_r$$

$$z = x_i$$

$$\begin{vmatrix} x - 0 & 1 - 0 & 0 - 0 \\ y - B_r & A_r + B_r - B_r & -A_i + B_r - B_r \\ z - 0 & 0 - 0 & 1 - 0 \end{vmatrix}$$

## 9 OUTPUT

$$A_1, B_1, C_1, D_1, A_2, B_2, C_2, D_2,$$