$R = \sqrt{m_1^2 + m_2^2} = \sqrt{0+1} = 1.$

$\theta = -\tan^{-1}\left(\frac{1}{0}\right) = \frac{\pi}{2}.$

$C.F = y_x = c_1(1)^x + (\sqrt{1})^x \left[c_2 \cos\frac{\pi}{2}x + c_3 \sin\frac{\pi}{2}x\right]$

To find particular solution,
Substitute $y_x = c_4 3^x$ in ①

$$c_4 3^{x+3} - c_4 3^{x+2} + c_4 3^{x+1} - c_4 3^x = 3^x$$

$$\cancel{3^x}\left[27 - 9 + 3 - 1\right] c_4 = \cancel{3^x}$$

$$20 c_4 = 1$$

$$c_4 = 1/20$$

So the general solution is,

$$y_x = c_1(1)^x + (\sqrt{1})^x\left[c_2 \cos\frac{\pi}{2}x + c_3 \sin\frac{\pi}{3}x\right] + \frac{1}{20}\cdot 3^x$$

Ans.

Q2. $y_{x+2} - 4y_{x+1} + 4y_x = 2.2^x$ —— ①

Sol:- Consider the homogeneous difference equation corresponding to ①, we have

$$y_{x+2} - 4y_{x+1} + 4y_x = 0 \quad \text{—— ②}$$

let $y_x = Ab^x$ be the non-trivial solution of ② then it must satisfy this equation.

$$Ab^{x+2} - 4Ab^{x+1} + 4Ab^x = 0$$

$$Ab^x\left[b^2 - 4b + 4\right] = 0$$