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$$a(x) = x \cdot a(x) + x^2 \cdot a(x) + 2 \rightarrow a(x) = \frac{-2}{x^2 + x - 1} = \frac{-2}{(x - \frac{1+\sqrt{5}}{2})(x - \frac{1-\sqrt{5}}{2})} = \tag{1}$$

$$\frac{cosi..}{\frac{2}{1-\sqrt{5}}x + 1} + \frac{cosi..}{\frac{-2}{\sqrt{5}+1}x + 1} \rightarrow \lambda_1 = \frac{2}{-1+\sqrt{5}}, \lambda_2 = \frac{2}{\sqrt{5}+1} \tag{2}$$

$$a_n = \alpha(\frac{2}{-1+\sqrt{5}})^n + \beta(\frac{2}{\sqrt{5}+1})^n + \gamma \tag{3}$$

$$0 = \alpha + \beta + \gamma \tag{4}$$

$$1 = \alpha\frac{2}{-1+\sqrt{5}} + \beta\frac{2}{\sqrt{5}+1} + \gamma \tag{5}$$

$$3 = \alpha(\frac{2}{-1+\sqrt{5}})^2 + \beta(\frac{2}{\sqrt{5}+1})^2 + \gamma \tag{6}$$

$$\Rightarrow a_n = \sqrt{5}(\frac{2}{-1+\sqrt{5}})^n + (\frac{2}{\sqrt{5}+1})^n - \frac{4}{\sqrt{(5)}-1} \tag{7}$$