

Topics to discuss

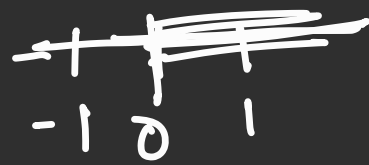
Solve $T(n) = \begin{cases} 3T(n-1) & , \text{ if } n > 0 \\ 1 & \text{ otherwise} \end{cases}$

by substitution Method

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Problem 1 :

$$T(n) = \begin{cases} 3T(n-1) & , \text{ if } n > 0 \\ 1 & \text{ otherwise} \end{cases}$$



$$T(n) = 1, n = 0$$
$$T(0) = 1$$

Solution :- $T(n) = 3T(n-1)$ — (1)

Assume,
 $n - k = 0$
 $k = n$

put, $n \rightarrow n-1$
 $T(n-1) = 3T(n-2)$

Then,

$$T(n) = 3^k T(n-k)$$
$$= 3^n T(0)$$
$$= 3^n$$

Complexity, $T(n) = O(3^n)$

Substitute,

$$T(n) = 3T(n-1) = 3 \{ 3T(n-2) \}$$
$$= 3^2 T(n-2)$$
$$= 3^2 \{ 3T(n-3) \}$$
$$= 3^3 T(n-3)$$
$$\vdots$$
$$= 3^k T(n-k)$$

Follow Now



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