$$T(n) = 9T(n-1) - 27T(n-2) + 27T(n-3) \underbrace{-4n3^n + n}$$

$r^3 - 9r^2 + 27r - 27 = 0$ E.C $r = 3, 3, 3$

$$T^h(n) = A3^n + Bn3^n + Cn^2 3^n$$
$$= 3^n(A + Bn + Cn^2)$$

$$n^t r^n = \{ r^n(A_0 + A_1 n + .. A_n n^k) \}$$

$$F(n) = -4n3^n + n$$

$$T^p(n) = n^3 3^n (Dn + E) + Fn + H$$
$$T^p(n) = Dn^4 3^n + En^3 3^n + Fn + H$$

$\cancel{3}, \cancel{3}, \cancel{3}, \cancel{3}, \cancel{2}, \cancel{2}, 2, 2, 5, 5, 7$ $3^n + n^2 7^n + n^3 + 5^n$

$$T(n) = A3^n + Bn3^n + Cn^2 3^n + Dn^3 3^n + E2^n + Fn2^n + Hn^2 2^n + In^3 2^n + J5^n + Kn5^n + L7^n$$

$$T^p(n) = Mn^4 3^n + \underset{\text{mult}}{n} 7^n(\underbrace{Nn^2 + Pn + Q}_{\text{pol ord 2}}) + \underbrace{(Rn^3 + Sn^2 + Tn + U)}_{\text{pol grado}} + Vn^2 5^n$$

$$T(n) = 4T(n-1) - 4T(n-2) + \underbrace{2^n + n}$$ $(r-2)$

$T(0)=4$
$T(1)=10$

$T^h(n)$

$$0 = r^2 - 4r + 4 \quad \begin{cases} 2 \\ 2 \end{cases}$$

$$T^h(n) = A2^n + Bn2^n$$

$$F(n) = 2^n + n$$

$$T^p(n) = Cn^2 2^n + Dn + E$$

$$Cn^2 2^n + Dn + E = C4(n-1)^2 2^{n-1} + 4D(n-1) + 4E$$
$$- 4C(n-2)^2 2^{n-2} - 4D(n-2) - 4E$$
$$+ 2^n + n$$

$$\cancel{Cn^2 2^n} + \cancel{Dn} + \cancel{E} = \frac{4C(n^2 - 2n + 1)2^n}{2} + 4D(n-1) + \cancel{4E}$$
$$- \frac{4C(n^2 - 4n + 4)2^n}{4} - 4D(n-2) - \cancel{4E}$$
$$+ 2^n + n$$

$n^2 2^n \quad C = \frac{4C}{2} - \frac{4C}{4} \qquad C = 2C - C \Rightarrow C = C$:)

$n2^n \quad 0 = \frac{4C(-2)}{2} + 4C \qquad 0 = -4C + 4C \quad 0 = 0$:)

$C = \frac{1}{2} \quad 2^n \quad 0 = 2C - 4C + 1 \qquad -2C = -4C + 1 \quad 2C = 1$

$D = 1 \quad n \quad D = 4D - 4D + 1 \qquad D = 1$

$cte \quad E = -4D + 8D \qquad E = 4D \quad E = 4$

$$T^p(n) = Cn^2 2^n + Dn + E$$

$$T^p(n) = \frac{1}{2} n^2 2^n + n + 4$$

$$T(n) = A2^n + Bn2^n + \frac{1}{2} n^2 2^n + n + 4$$

Sol general

$T(0) = 6$

$T(1) = 12$

$6 = A + 4$ $\boxed{A = 2}$

$12 = A2 + 2B + 1 + 1 + 4$

$12 = 4 + 2B + 6$ $B = 1$

$$T(n) = 2 \times 2^n + n2^n + \frac{1}{2} n^2 2^n + n + 4$$

Solución Total

$$T(n) = 2T\left(\frac{n}{4}\right) + \log_4(n)$$

$$\underline{n = 4^k}$$

$$T(4^k) = 2T\left(\frac{4^k}{4}\right) + \log_4(4^k)$$

$$T(4^k) = 2T(4^{k-1}) + k\log_4(4)$$

$$T(4^k) = T_k$$

$$T_k = 2T_{k-1} + k \qquad R.R \qquad r - 2 = 0$$

$$T_k^h = A2^k$$

$$T_k^p = Bk + C$$

$$Bk + C = 2B(k-1) + 2C + k$$

$$Bk + \cancel{C} = 2Bk - \cancel{2B} + \cancel{2}C + \cancel{k}$$

$$k \Rightarrow B = 2B + 1 \longrightarrow \boxed{B = -1}$$

$$c\text{te} \Rightarrow C = -2B + 2C \longrightarrow -C = -2B \qquad \boxed{C = -2}$$

$$C = 2B$$

$$T_k = A2^k - k - 2 \qquad T(1) = 4$$

$$T(n) = A2^{\log_4(n)} - \log_4(n) - 2 \qquad n = 4^k$$

$$T(n) = An^{\log_4(2)} - \log_4(n) - 2 \qquad k = \log_4(n)$$

$$T(n) = A\sqrt{n} - \log_4(n) - 2 \qquad a^{\log(b)} = b^{\log(a)}$$

$$4 = A - 2 \qquad \boxed{A = 6} \qquad \boxed{T(n) = 6\sqrt{n} - \log_4(n) - 2}$$