

Math 451

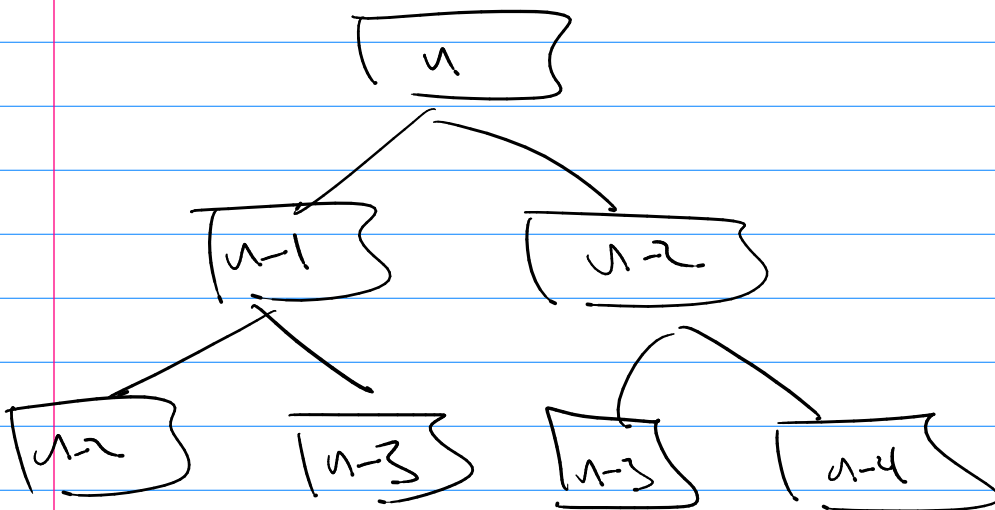
inductive (recursive)

Basis $a_1 = 1$ $a_n = 2a_{n-1}$

$$a(n) = 2a(n-1)$$

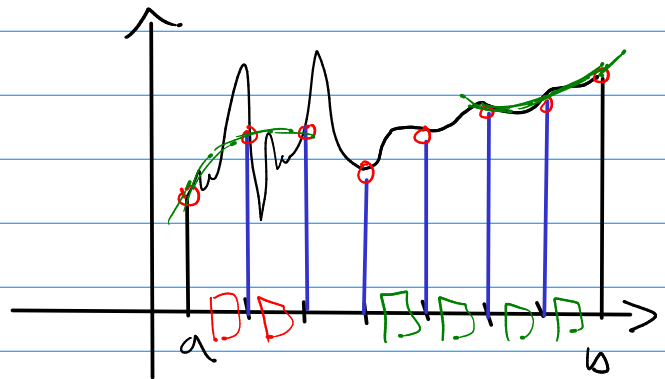
1, 2, 4, 8, 16, ...

$$a(n) = 2^{(n-1)}$$



recursion and integration

basis
recursive formula

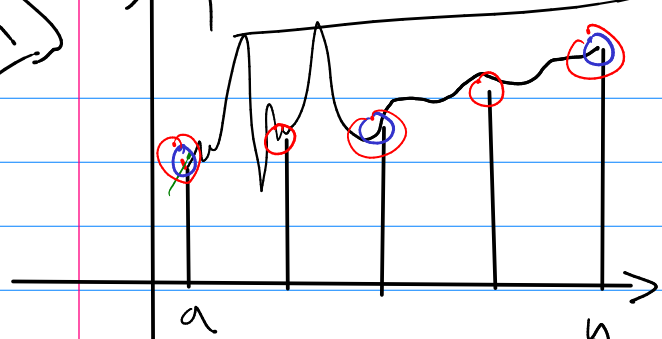


uniform quadrature let $n = \text{constant}$
 $dx = \frac{b-a}{n}$

L_n, R_n, M_n, T_n, S_n n must be even

S_n

rec int (f, a, b)



$x = [x_1 \ x_2 \ x_3 \ x_4 \ x_5]$

$y = f(x) = [y_1 \ y_2 \ y_3 \ y_4 \ y_5]$ ans = S_4

basis:

$$S_2 = (b-a) \left[\frac{y_1 + 4y_3 + y_5}{6} \right]$$

$$S_4 = (b-a) \left[\frac{y_1 + 4y_2 + 2y_3 + 4y_4 + y_5}{12} \right]$$

$\rightarrow f \text{ abs}(S_4 - S_2) < \text{tol}$

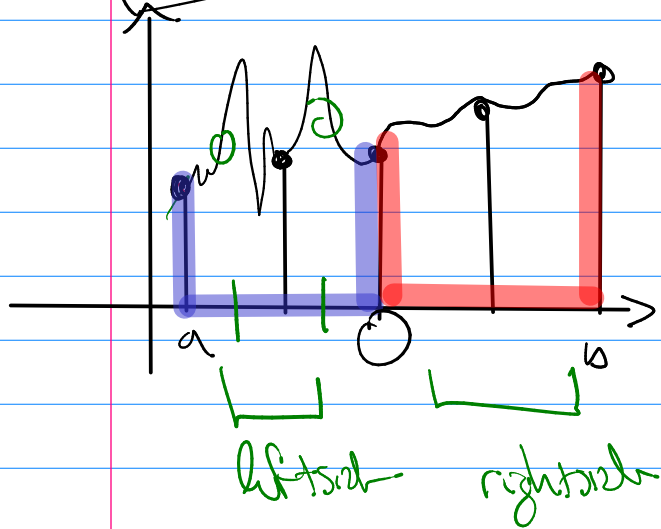
Trickche
Recursive!

else

$$\text{leftside} = \text{rec int} (f, a, \frac{a+b}{2})$$

$$\text{rightside} = \text{rec int} (f, \frac{a+b}{2}, b)$$

$$\text{ans} = \text{leftside} + \text{rightside}$$



See video!