$\frac{8}{a}$

THE FIRST 3 LAGUERRE POLY'S ARE

$L_0 = 1$

$L_1 = \ -x$

$L_2 = x - \ x + 2$

SHOW THE ORTHO OVER $x \in [0, \infty]$ RESPECTIVE TO WEIGHT FUNCTION

$w(x) = e^{-x}$

NOTES: GAUSS-LAGUERRE QUADRATURE

DEFINE,

$$\langle f, g \rangle = \int_0^{\infty} f(x)\, g(x)\, e^{-x}\, dx$$

AN INNER PRODUCT.

"LAGUERRE POLYS" ARE ORTHO TO THIS...

YOU GET THE "LGR PLY'S" BY G SCH ORTH LN

... APPLIED TO

$\{1, x, x^2, x^3 \ldots\}$

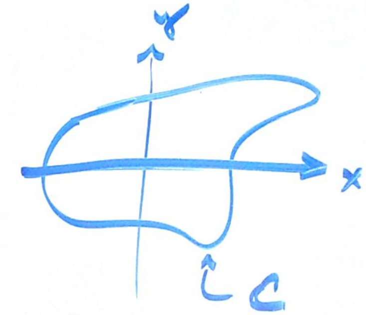
$L_0 = 1$

$L_2 = x - 1$

$L_3 = x^2 - 4x + 2$

$\vdots$

$$L_n(z) = \frac{1}{2\pi i} \oint_C \frac{e^{-z\frac{t}{(1-t)}}}{(1-t)\,t^{n+1}}\, dt$$



$$c_j = \int_{\emptyset}^{\infty} l_j\, e^{-x}\, dx$$

LAGRNG. POLYS

SO, NOW,

$$\int_{\emptyset}^{\infty} f(x)\, e^{-x}\, dx \sim \sum_{j=1}^{n} c_j\, f(x_j)$$

... SO HOW DOES THE WEIGHT f HAVE A SHARED RELATIONSHIP BETWEEN LAGUERRE POLYS BEING ORTHO W/ x ... e^{-x} IS WGT FUNC.