Denystituation of blackstock's nonlinear wave equation for string. Start with Newton's second law &1 AXPS++ = Tm(+10) -Timo Str = Lim Tru(0+10)-Tru0 X+Ax = T & (RMD)  $|\hat{\theta} = \theta(x)|$ = T coso 20 Now we need to find this cost and 20 in terms of &:  $\frac{\partial R}{\partial s} = \cos \theta \qquad \frac{\partial s}{\partial s} = \sin \theta$ Divindey the two gives tan 0 = 28 25 5x 6 $l = \frac{1}{\cos^2\theta} - \tan^2\theta \implies \cos\theta = (1 + \tan^2\theta)^{1/2}$ = (1+ (28)27-1/2 1. n 0 = cos 0 tand = 38 (1+(35)2]-1/2 Take 2 cos O(x) = - Sw O(x) 20  $= -\frac{1}{2} \left[ 1 + \left( \frac{35}{3x} \right)^2 \right]^{-3/2} 2 \frac{32}{3x^2} \frac{35}{3x} \frac{35}{3x}$ 25 [1+ (3x)2]-1/2 20 = [x+ (3867)]-3/2 225 28  $\frac{\partial \theta}{\partial x} = \left[ 1 + \left( \frac{\partial^2 g}{\partial x^2} \right)^2 \right]^{-1} \left( \frac{\partial^2 g}{\partial x^2} \right).$  $\frac{\partial \theta}{\partial x} = \cos^2 \theta \left( \frac{\partial^2 \xi}{\partial x^2} \right).$ 

Put the result into 
$$gSH = T\cos\theta \frac{20}{7K}$$

$$gSH = T\cos^3\theta S_{XX}$$