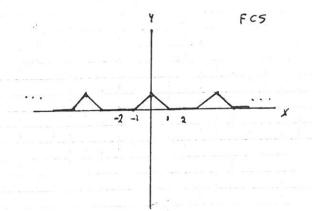
MATH 4545 QUIZ #1 NAME Find and Sketch the Fourier Cosine Series and Fourier Cine Series
of $f(x) = \begin{cases} 1-x & 0 \le x \le 1 \\ 0 & 1 < x \le 2 \end{cases}$ F.C.S. f(x): 40 + 2 an cu "x $q_0 = \frac{2}{12} \int_{-1}^{1} S(x) dx = \frac{1}{2}$ $a_n = \frac{2}{L} \int f(x) cn^{\frac{n\pi}{L}} dx = \left([1-x] cn^{\frac{n\pi}{2}} dx \right)$ = (1-x) . 2 sin 47 x / + 2 / sin 40 x dx $= -\frac{4}{4\pi^2} \cos \frac{4\pi x}{2} \Big|_{z=-\frac{4}{4^2\pi^2}} = -\frac{4}{4^2\pi^2} \cos \frac{4\pi}{2} + \frac{4}{4^2\pi^2}$ (f(x): + > (4/2 - 4/2 cm 2) cm 47x) F.S.S. f(x) = 2 ly Si htt dy: -dy v= - 2 cn 4/1) by = = = [(1-x | si "x dx = (1-x | si "x dx $= (1-\chi) \left(-\frac{2}{4\pi} \cos \frac{4\pi \chi}{2}\right) \left[-\frac{2}{4\pi} \left(\cos \frac{4\pi \chi}{2} d\chi\right)\right]$ $= \frac{2}{4\pi} - \frac{4}{4^{2}\pi^{2}} \sin \frac{\pi x}{2} \Big|^{2} = \frac{2}{4\pi} - \frac{4}{4^{2}\pi^{2}} \sin \frac{\pi x}{2}$ f(x/2 = (47 - 472 sin 2) sin 22

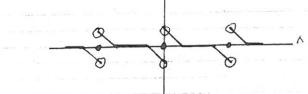
SOLN





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A SLBVP Civer De S-L BUP S F"+1F=0, f-F(x) OLKEI Hol=0 3 f(1) - 2 f (1) = 0 Find e-vals and e-futions (1=0) f(x1=xx+p f'(x1=x SULN: flo1=0 => (B=0) => f(x|=ax f'(x)=a 3 f(1)-2 f'(1)=0 => 3d-2d=0=> (d=0) p=d=0=> d=0 kot an e-val. >0) f(x1=qcn va x +c, c. va x => f(x1=-c, va c. va x + c. va c. va x f(0)=0 => (1=0 => (f(x)=c, s: VAX) f'(x) = c2 VACNVAX 3f(1)-2f'(1)=0 => 3 & cm va - 2 de va cu va = =0 (ton 12 = = 51) egg for + e-vals <0) let 1=-a², a>0 f(x)=c, conhax +c, sinhax f(x)=ac, sinhax + ac, sinhax f(01=0=> C1=0=> f(x)= (c2 such ax) filx1 = a czenhax 3f(11-2f(1)=0 => 3 dz suha -2 a dz conha =0 equ for - e-vals: (tanha = = = a) (a= \(\sqrt{-1} \) first few solutions to the eggs are shown: -4=2X let x= 1 1>0 a= J-2 VA2 = 4.4 VA3 = 7.7 ---1 = -1.69

MTH 4545 20 A SLBVP Cive Ne S-L BUP & F"+1 f=0, f-f(x) 0=x=1 A(0/=0 3f(1)-2f(1)=0 Find e-vals and e-futions 1=0) f(x1=xx+p f'(x1=x SULN: flol=0 => (B=0) => f(x|=ax f'(x|=a 3 f(1)-2 f'(1)=0 => 3x-2x=0=> (x=0) == x=0=> 1=0 kot an e-val. >0) f(x1=qcn va x +c, c: va x => f(x1=-c, va c: va x + c, va x av x f(0)=0=> C(=0=) (f(x)=c, s: VAX) f'(x) = c, VACNVAX 3f(1)-2f'(1)=0 => 3 & cm va: -2 de va cu va: =0 (touts = = TT) egu for + e-vals <0) let 1=-a², a>0 f(x)=c, coch ax +c2 sinhax f(x)=ac, sinhax + ac2 coch ax F(01=0=> C1=0 => F(x)= (c2 sunhax) fi(x) = a cz cnh ax 3f(11-2f(1)=0 => 3 dz suha -2 a dz cocha =0 egn for - e-vals: (tanha = = = a) (a= \(\sqrt{-1} \) first few solutions to the egns are shown: -4==× 11/2 let x= 1 1>0 a= -

VA2 = 4.4 VA3 = 7.7 ---

1 = -1.69

Fd. = 1.3