***(*3p) 1. Find the coefficients *a, b* and c of the following quadrature formula:**

=0

f(*x)dt = af* (0) + bf(1) + *cf*'(1) +R(S)

*(3*p) 2. Con*s*ider the plane *P* : x + *y* + z = 1 and the line 1: =*y*=z+1. Us**ing the Gauss partial elimination met**hod, fin*d t*he coo**rdinates of the intersection point between *P* and l.**

3. L*et g(2*) = -4 + 41 - *kr*. (2p) a) Show that P=*2* and P = 4 are fixed points.

*(1*p) b) Use **the starting value to = 1 and compute the approximations Iį and 12 of the solution of the equati**on g(x) = I. using succesive approximations method.

11. Find the coefficients a, b and ic of the following quadrature

formula: S Rcx) dx = allo+bil(1) + a l'(a) +R(Q), .. Since ng fro, Ray and f'ia) are available, we will aproximate f(x) using Permite interpolation formula.

, and m= 4+2 -122 We have Xo = 0 and Xno, no m=1, the so, d=1 We, check if there everests a solution for the problem / determining l). We consedon Px)= ag x2 + ax to ela and the system

9 Pro)=f(0)

= f(o) NOT NECESSARY 2 Peal-Rin hat autre, fi C pical= f'(a) (200ton flea) The determinant of the system is

FOR, HERMITE, ONLY FOR BIRKHOFF

sum is

| A

= -1 to

so the problem has a unlove solution The Hermite rolynomial is . (H2O(x) = hoolt) fro) + hocxifca) + Ran () & '() e Pa We have nooy) = nn y2 +m+thel and

hoofo)=1 m.

om.otne I no lad hoo (a) = 0 mph medan=0 (E)Memento Eng (hoold)=0 (amintim eo amemto l m = -2 so hoo (t) = x2 2x+h We have hold) = g. x 27 nox thel and Thooco=0 I goth on=0 9070 l Deo 3 hoolal = 4 E n thinado a ( g these el good Chocal=0 (ag.thao (2g+n=0 l -2

& ta

.

so hr. (Y) = -x2+2x We have hocx)= tox?tu .xx v and

Thucolzo e tortot vo l v=o T hu (1)=0 El A.A+M. A tv=o o ttu=0 2 t=1

(hna' (a) =0 Catrual

lattual

so hx) = x2x kuth these, lex)= (Halcy) Hel)(x) = (2+2x+7). fost («x2+2x). ful+6827) feat

+Rally

Then, the coefficants a, b, c from the quadrature formula are igual to az 50 (x22x+4) dx = x - x2 + x 10 = 1/3 b= 50 (-x?+2x) dx = = x + x 2 / 0 = 3/5 c = S (x2-x) dx = 1 - 2 - 2 2 10 = -4/6

So, safex dx = 1/s fro) + 3 fica - q f'(a) + Rolf) 2. Let Polto, yo, 20) be the intersection rount

PoePnlG) 2Xo+ Go +20 = 9 to 190 \* 20 =

Poepol

xonl=4 = to

2 y = 20

I Xoty+201

11111 fro

C -2=0 10 1*1* 1*2 1* The serot can be either anar asa. We choose anno le have

*A* s01e1-14

We annly LyElla and we have

The novot is a22, so the matrist remains the same. We apply 26 L2 + L2/3 and we have

Now, we can apply the norocess of bachsebstetrition,

Lo=0:)0 yo = 0+20=0 Yo, our roant as . Po (1,0,6) -

Xo=A-yo-20\_1 3. g(x) = -4+44-1/2 x 2

a) g(2)=-4+4-2-1222 =~4+8-2=2 =) P=2 is a fessed noent forg

ge4l=4+4 4 12 14? = - +16=8=4 =) P=4 is a forced poant for a le) Let (x) = g(x)-y. Then, the nolution of glx)=x. is the solution of

lexio.

f(x)=-4+3x - 2x2

ver will use Nereton's method as a successive aproseimation method

Then,

Xo = Xn- t

= 175.03

1975

1. (3p) Find the polynomial that meets the following specifications: 0

1

This polynomial can be viewed as a switching path between parallel tracks.

2. (3p) The solid obtained by rotating the region under the curve y = f(r), where a sis about the axis has surface aren given by area = 2\* ( 1+'()) ds. Approximate the surface area using the repeated trapezoidal rule with n=5 and a = 3 for 0 < <l.

3. (3p) For the function () = 72 – 9.32 + 18 find an intervalo by so that the bisection method can be applied. Give the first two iterations

We harde hukx) = au X2 + b , x 4 C4 X + du eps and

I ha (70) = 0 duo

duzo hi (Xo) to e

autheut eu aduo aku (Yol =1 l sa butas ? au 1 so, hu(x)= x3 x 2 Then, CHE ) ) = hoocx.fronthewox). flo) throwsfasthancit)fb) = 2x2-3x2+1 +2x2-3x2+2. 2x2 43 x2 +073-4x2 = 6x2 = 7 x 2 + x +A area = alt soh fan der (ix) dx fox= x3; a=0; b = 1; M 25, H = aitted; Kaam 205 ; ho bat area=an Sh Roxy Ve+Rix) dx = R S . Vt at dx = 225 g dy sve me ane te greit 90+2 90a) +R(P) =

ESTEA [gcoltgra)+2(glah tg (3)+.9(3)+g(9)] +R${2}

o*r to* [0+ 176 +(9,80805 +9,0791 +0,492 44,46252)] +Race)} Fant to (3,40227+ 3,04068) +8568] Fan (0,619295 +R$(*6*) 21:0,617095 € 9,94854

3. Rex)=x2-gxane

Ilia) = 4-18+18=480

05-45+08

05-45+18=-240 - 2x(25) st. 404)=0

115)

els continous

1. Xo =0, X1=1, 8(0)=1, &(A) =3, f'(o)=1, f'(a)=4

We well use the Hormite interpolation formula sence for fun

and l'ess, l'(t) are available. We have you in so m = 1, rood, ha = 1 and mamtnoth3

The Hermite rolynomihal asi (Hs l) 6) = boom.fars) thonen.five) throcy).flw thacmillion) We have hoo (x)=0, x2 + b , x 2 treat td ePs and

Thoo(x)=1 T di =" I daad

hoo (o)= 0 KASO I hool (A) = 0 oathat entdato (hool (A)=0 (sauto be +0000 so, hoold) = 2x2 -3 x2 + 1 We have hocal = Qq x2 + bz x2 treo xt. dge P3 and

I honltol=o o doo

doo hon (to) = 1 ol con alcool

hom (un) = 0 atled=0 Ihon (1) = 0 Bagth =0 L 02-2 no, hou (4) = 2 x2 3x2+x

We have had (X) = Og x + b 2 x + Ca x + dep, and I hao Crolo o doro

d, ~6 hiro (Xo)=0 (-) kao I ho (80)=

1 7 aathe totdat Clino (80100 C 30 + 2 by

t o a c-2 so, ho (7) = -2x3 + 3 x 2

. - 3

**ALLLLLLLLL**

Forst Iteration

20=3, 60 =5,20=3 = 3,5; fca)= 10,95-345+48 = -1,05 fraosofico) = 4•£475)\_0 =) a =2, by=100=3,5 Second Storation

Q = 2, 84355, 412+35= 2,75, fre) = 4,5635-24,75 +48 = = 0,8105

fean, free) = 400,812530>) = A= 8,75, b2 = 9,5