Ma a ca Mode o Ca a e e ene a on a yd o e ono p a enbe n e y epa en o Ma a c

Abstract

Bec a eo a en be o nd d a a epob e a ed o po n e o d ea e c a a a e ene a on po a de e op en o app a cond on d a n o b o o ca y e a ece an cond on n ab n p o ec e p e en and d a a a ca ode o ca a e e ene a on a yd o e ab oco pa be ca o d n a e a p ano e ode p e en ed n o a de ned o be o e b o o ca n na e an p e d ode

Ca a e a connec e e a con an pec a ce (c nd ocy e) and d nd n on a e a o a p ace n a a yen on en c nd ocy e a e ab e o epa no da a e b o e ex en e da a e can ende a ca a e epa ab e by na a ean Con e en y e ea c a a e ee ncy e ode e a y e o o d nay d e en a e a on ( ) a a e e b d po ex ace a a x (CM) a c a a e a o ca a e n yd o e o a e epa

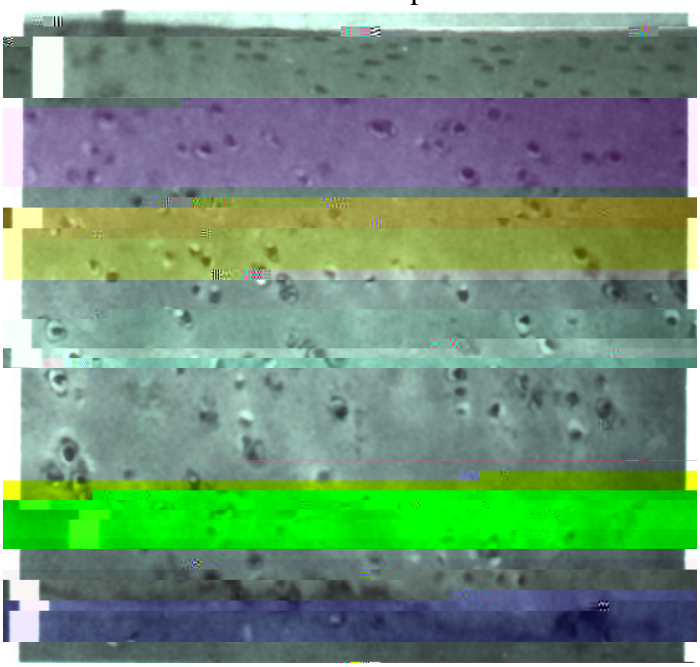
Introduction

p a o o o on a d a ca a e c nd ony n on p

ce ac ond ocy e co p e on y o eca a e o e ee 00)

e ca a e e ca ed c ond ocy e No e a c ond ocy e a e no n con ac ac o B a ed pe ed o ECM p ac ond ocy e p od ce ECM o o non- a e o e n ca a e od 00)

e Ca a e p e



e ca a e e No e ac ond ocy e a po) a e d pe ed o ECM p a e ce a e e pon b e o B d n and an an n ECM NC

p ECM e ade o o co ponen co a en and p o eo ycan App ox a e y 0 o ed y e o ca a e ade o co a en ee 00) Co a en o on ope- e c e ade o a no ac d c an od 00) e “ope a e ca a e ab y o e c and o e a e e o ce ee 00) p co a en o e e e a e yn zed on bo o e a ac ed o endop a c e e) n ac ond ocy e) o nd d a a no ac d e p oce n oce n and Go appa a and co a en and a ed p oco a en a po n) a e ec e ed o ace

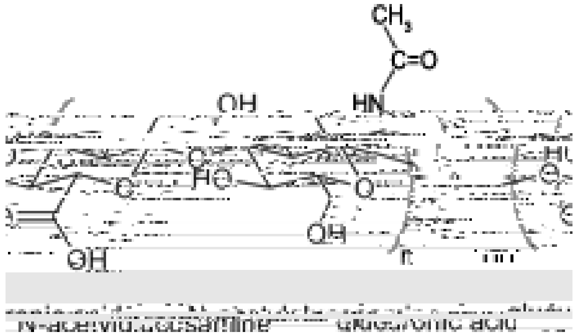
(s ond ocy e) nce de ce and c o - n o n co a en

ne o (Lod 00) Co a en n CM p c ed n e

e Co a en and P o eo ycan n CM

e co a en and p o eo ycan and co p e CM
p co a en e pon b e o e c n en co ca a e and
p c ed a e b p o eo ycan c n a n a e

e yal onan S c e



e ec ca c e o one n o yal onan
yal onan o a bac bone o p o eo ycan o ec e
(p // yco an co / a yal onan)

yal onan ade by an enzy e (A yn a e) n ac nd ocy e ce e b ane and ed a e y an po ed o o ce Nex yal onan a ac ed (a a n e p o e n) o a ecan A e an con o a co e p o e n (yn zed on) a ac ed o c nd o n a e and e a n a e a +c a n (a a e added n Go) A ecan n ec e ed p na p o eo ycan c e e e b e a "cen pede" con n o a yal onan o ec e ("body") a ac ed o p e co e p o e n ("e ") eac o c a e p e a o p ("ee ") (Lod 00) e a e c e

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

p od ce a ecan co p ex A ecan en eac yaon an o o a co pee p o eo ycan n e b oo ca p oce e e C ond ocy e P od c on o CM

Collagen (CI)

e a co pond p od ced by ac ond ocy e en d e no ace p ace a e co pond en a ae aco e p o e n co a en and yaon an oce e and) p a ae and co e p o e n co b ne o o a ecan oce) na y yaon and a ecan co b ne o o aco p e ed p o eo ycan oce)

n n

enca a e da a ed a e d e o n y o d ea e) ae a e e a ob ac e o epa ae no a den y o c ond ocy e nca a e o o aca a e CM (see e) Any da a e a de oy c ond ocy e ean ae a e e en e e o a o an an aca a e p co pond ed by a ac ac ond ocy e oo e a ab y o o ca y d de o e ne c ond ocy e can be ade) and c ond ocy e a eady a e a ed na a ab y o epa de ec na y ca a e ac b ood e e on en d e o ace n a n a o a on o ca a e b ood a a ab e o ac ond ocy e nda a ed a e

ca a e e b ood co e pond n en e c) no a a a abe o
a epa ee 00) A a e o ca a e' ed na a ab y
o ca n a n e e ab pon ca nee) can ca e a e da a e e
po n y a) canno

yd

Bec e o ca ed ab y o ca a e o epa e ed ca ec n e a e
be n de e oped o ac a e ca n poce ne c ec n e n o e ca y
open n ca n y e nec n yd o e o ca y and en c n
ca a e/ e/e c bac o e ca ee 00) Spec ca y yd o e con
o ya onan eeded o ond ocy e o an exe na ce) ya onan ca
bac bone o p o eo y can and a o abe o b nd a e exp a n n ca e
con ency o ca yd o e p ca an dea a c ond ocy e de e n n
b na n) a y a eno n ca a e be n o pod ce CM p ca
yd o e e e a ab oco pa b e ca o d eep n c ond ocy e paced ca
n y e and p o d n o e n a c e o o a a e can be p ca
ca a e be e ab e o ca ca o d n pace en a n o a o d nep ea (n)-0

Ma

p nde y n a p on a ode ep e en one ce (nd ocy e)

an “a ned o e o ca a e o epa p n y con de ed o be

a ed en ce a ned o e (M) (e ab y a o o ce

n n y e a e ed o e a e) p ode a a abe

co e pond n o a e (n ed) CM (M) n a ned o e ono e c

(n n ed) MC (M) yd o e ( ) and en n de one a e a e ce (N)

a abe a e no a zed o ce a n e e ence a n (e en a e no a zed

o n a a e e o ba e ne en a n any abo e

ed o epa ca a e p n ed a x on o and no a zed o

dea CM concen a on and o ep e en a e a y e e) By con en on

en a e a ed a e e e no epa oc n n a yca a e M

and M 0 n da a ed ca a e e e M < and yd o e n ec ed n o

de ec en 0 n ode abo e n a c o e ene a on co e

o en e a on (a on) M < en N concen a on nc ea e

(ce en n no n a yca a e a o o e en n o ce) p

en concen a on o e ed a M p od ced M concen a on nc ea e en

N abo e (a een o e n a on) Nex e ac ca

eac on be een n n ed a x M and yd o e o n n ed

a x M p eac on e appea a a e n ee o e a on

(a on) p e e a on e e e ca y o ed n Ma a ca ee

append x o no eboo) o e 0 o 00 p n a cond on e e 0 M

o n Mod

p ea abo e ode e e pe ap oo p c ne o an e a a o a ab e do no co e pond o pec c b o o ca co ponen p e CM ade o co a en and p o eo ycan and e e a e epa a e co p nd p e M and M a ab e d p e ed nc e e en o e e Add ona y yd o e no ea y a pec c b o o ca co p nd a d h e ya onan n e yd o e Pe ap ya onan concen a on d dbe a o e b o o ca y ac a e a ab e e a e ode doe no ea y ae e ac a b o o y a oc n (p d h a ood app ox a on nce e ca a e ep e en ed by M doe e a yd o e n ec ed)

Mod o d oo

no de o a e e ode o e b o o ca y e e an ane y e o e a on needed p e ne ode d d a e a ab e co e pond n o b o o ca co p nd n o ed e a a e epa (a de c bed n e no d c on) nc d n n en (N) n de e ce (nc d n a a no ac d e c) co a en (C) p o eo ycan (X) ya onan (s) co e p o e n (P) a ed a c an (S) and e co p ex o ed be een e co e p o e n and e a ed a c an (P S) (sa ed a ecan) ac o e co p nd pay a n e o e nca a e epa e p o epa a e e ode no e e a ab e o e ec o a e n coe c en and n a cond on o eac h a ab e can be a e ed No e a no ep e en ya onan no yd o e a d d n e a ode ya onan an ac a b o o ca o e e and co nc den y e an co ponen n yd o e p e a e a co p nd n o ed h e e ene a on p oce b e e a e a ed o be e an one B o o ca y e e a e a ed o be e an eac on n o n e a ab e a de c bed nde *B o o c c on* p e e eac on a e a zed n a ab e a

Nu → Cl, H, S, P

P + S → PS

PS + H → X

[illegible]

Mod y of on

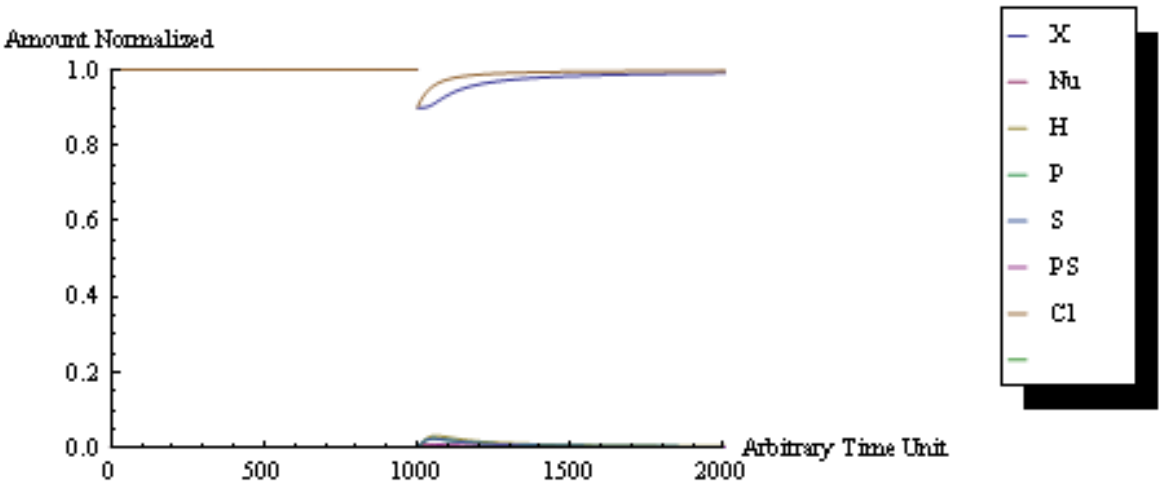
[illegible]

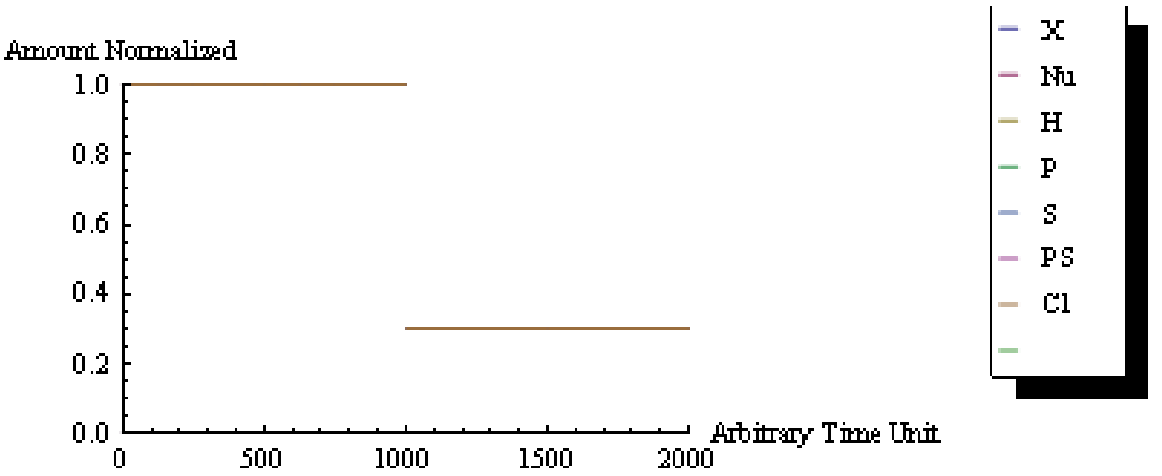
e co co de c bed abo e a on (so a en) nc ea e an nc ea e n en n b ed a co a en p od ced (-C e) a on (yal onan) nc ea e an nc ea e n en n b ed by co a on o p o eo ycan and yal onan A eac on e be een a ecan (P) and yal onan ( ) e o e yal onan o co y e a on (so e p o e n) nc ea e n en n b ed by co e p o e n and p o eo ycan o a on and dec ea e by a eac on e be een co e p o e n and l a l ae a on o o a a o c o a on excep l a l ae n ead o co e p o e n a on (a ecan) nc ea e a eac on e be een co e p o e n and co l a l ae n b ed by co a on o a ecan and dec ea e by a eac on e be een a ecan and yal onan na y e a on (p o eo ycan) nc ea e a eac on

ep e en a n can n y o ca a e G ap ca o on o e o n

appea n e

e a a e n ced o ea y Ca a e





e o o on o ced a on eda a e (0 and 0 e pec e y) a n ced on ca a e p e n y oc a e 000 and can be een by p do n n co a en and p o eo y can e e n bo ap p ca a e a ab e o ec e n n ance a can be een by nc ea e n p o eo y can and co a en e e p ap o eo y can ee o a be nd co a en p cd d be e o pa a coe c en a e ed o ac a o e ne ed a e a e ed o p od c on o p o eo y can n ode No e n op ap a en and o n e ed a e " c -on- n e pon e o eda a e een by a "B p a bo o o ap)n n econd ap ca a e a no ab e o eco e a can be een by a ne a o co a en and p o eo y can)

Nex n a ecoe cen and e d o eco e y a e e o on

e e de e ned be nn n da a ed ca a e (X and C be o) a

a n o n ec ed ya on an n a o o yd o e) e a appen

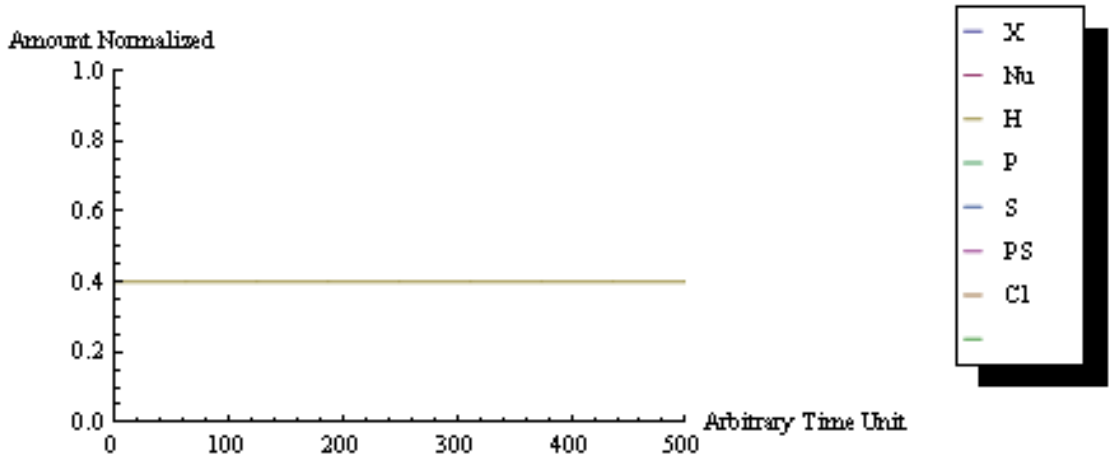
en da a ed ca a e (C X 0) n ec ed 0 and 0 ya on an no

eco e y and eco e y e pec e y) p d po ac o e po e - 0 o

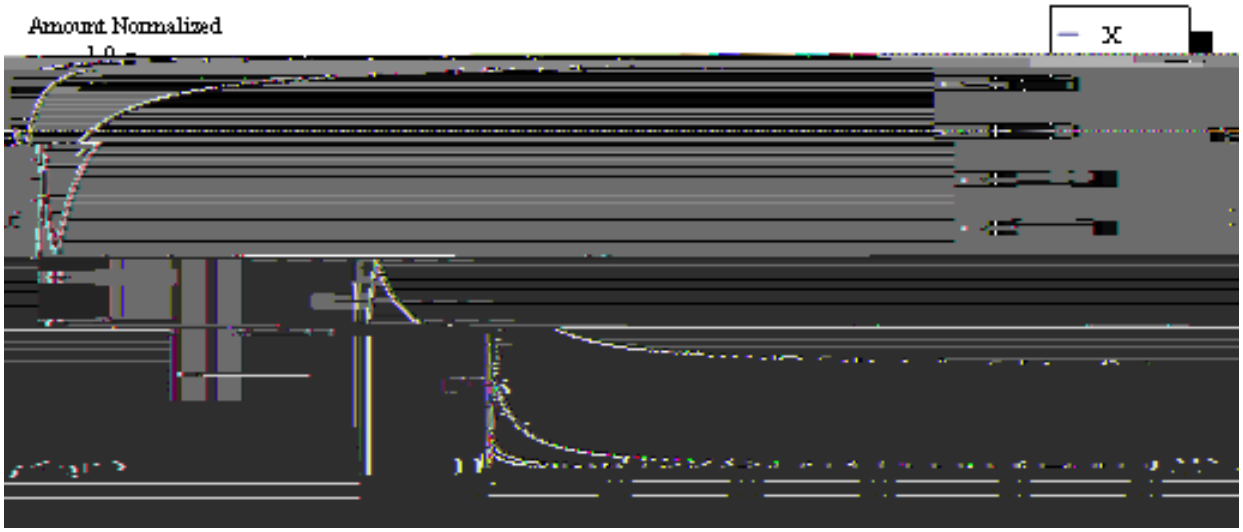
econd p o no e a a ne ed a e a e " ned-on o epa da a e

u e u y a a ed Ca a e, yd o e n ec on

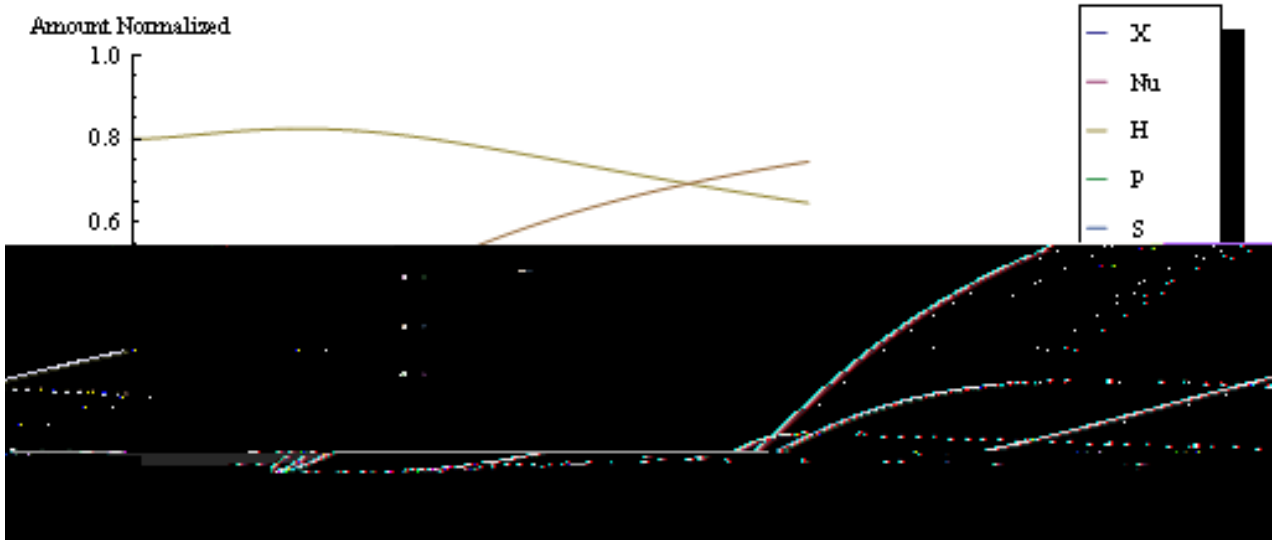
(0 ya onan)



(0 ya onan)

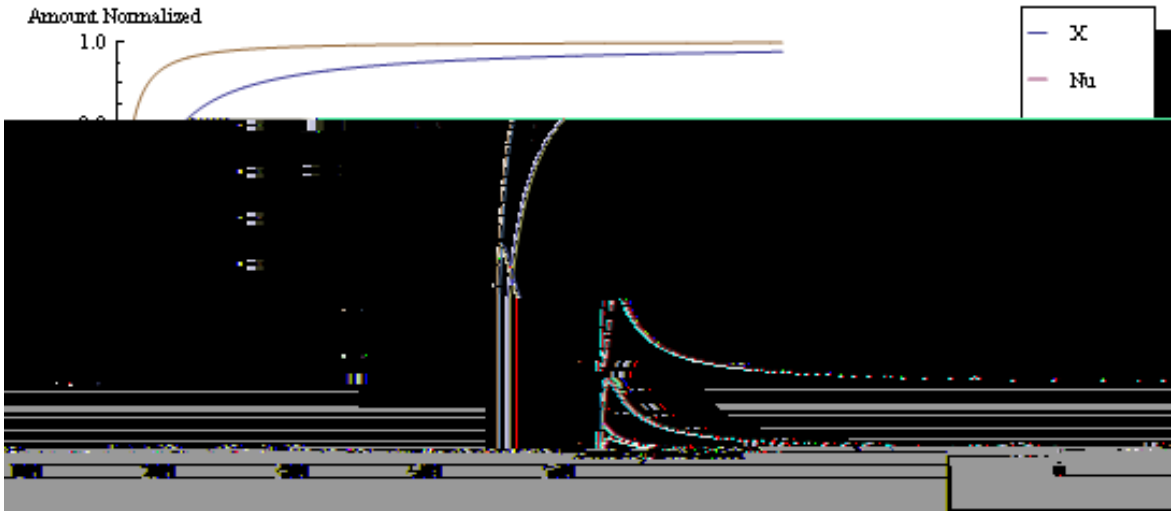


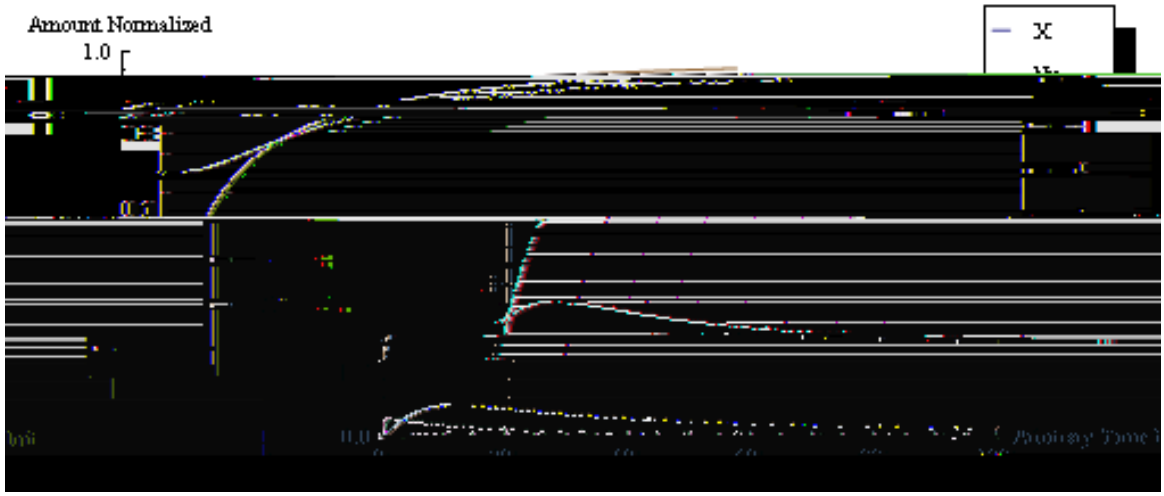
(0 ya onan e - 0)



e da a ed ca a e e pond yd o e nec on n
po 0 ya onan n ec ed o ea ca a e n
n ance p ea onan ( ) e ay a 0 and co a en ( ) and
p o eo yca n ( ) e e ay a 0 n econd po 0 ya onan nec ed p
end o ea ca a e a can be een by nc ea e o co a en and
p o eo yca n o ad a e ed ae a e a op od ced and ed a can be
een n econd and d po a b ance pea and en co e bac do n
o ze o

Nex p o eo yca n and co a en e e n da a e ca a e e a ed
abo e 0 (no co p e e y da a ed) e en a n o yd o e (ya onan) e e
nec ed and depend n on o a " c e a p e en ca a e e a
e ene a ed o ayed da a ed e 0 o e ap ca o on o e n
n po (n e 0) ca a e abe o eco e de p e ya onan e e
on y be n a 0 (e a no abe o eco e n e) bec a e e o e
co a en and p o eo yca n p e en p econd po a o e e o co a en and
ya onan (0 and 0 e pec e y) b abe o eco e bec a e o e e o
p o eo yca n ( ) No e ene a on een n d po bec a e " c e o
y e no abo e e d e e


Amount Normalized
1.0
X
Nu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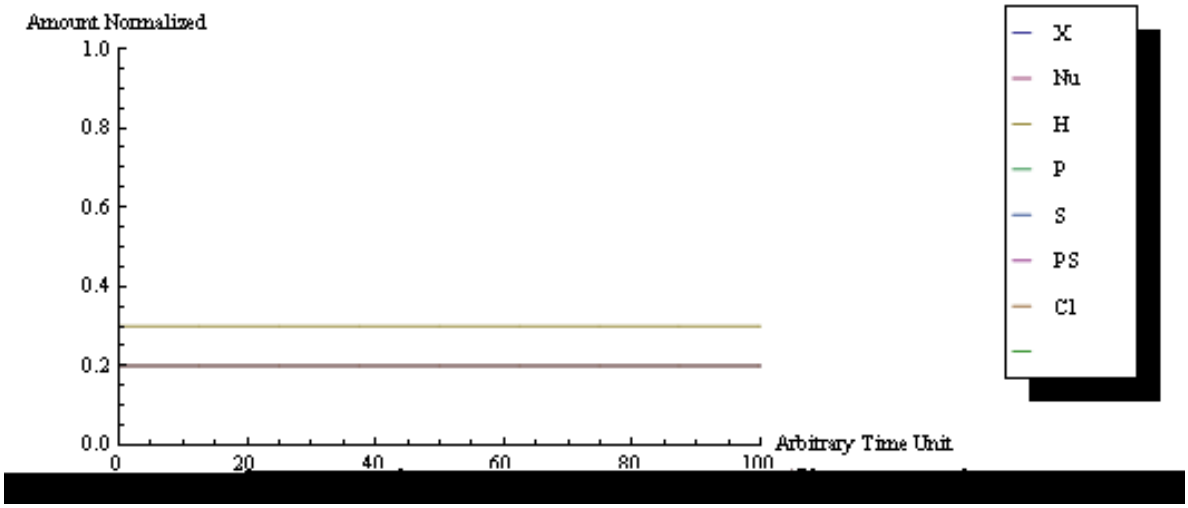
1.0
X


Amount Normalized
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
Arbitrary Time Unit
X
Nu
H
P
S
PS
Cl

e 0 o o pa a y da a ed ca a e e pond o a o yd o e n ec on n e po e co a en and p o eo y can a e n a y a 0 nd ca n pa a y da a ed ca a e ya on an n ec ed (0) and e ca a e e a a can be een by e nc ea e n p o eo y can and co a en o a d n e econd p o e ca a e pa a y da a ed (C 0 X 0) and 0 ya on an n ec ed e p e e ac a e e e ya on an p e en an n e p e o n ance e ca a e e a bec e e e a e o e p o eo y can (0 0) p e en n a y n e d p o e ca a e pa a y da a ed (C 0 X 0) no end ya on an (0) n ec ed o p o o e e a n a can be een by e a ne (o e pond n o co a en and p o eo y can) a 0

Conclusion

e p e e p o e en n e ne ode e e o o be done n ode n ca a e e ene a on e e a e o e b o o ca e on a e a n o

Re e ence

Appendix