



SIMON FRASER UNIVERSITY



P5002IJ"BO"X": 2I<?>\$; 54QJ"#0WRST)Z0"

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L\$512"50"31\$8=145\$0"608"1Z"50851642<"4?64"0611645\$0"5<"6"3\$; 219=@607=672"\$9%"2856"
12312<204645\$0<"

H+d."F507", 5"5<"6"A?\"<4=8204"50"4?2"a61=@E"\$9"-8=1645\$0"64"B5%\$0"al6<21"e05L21<54E0"8?2"5<"
0\$; "50"4?2", 607=672<"/=@=12<"608", 54216152<"31\$716%": 21"6126<"\$9"504212<4"501=@82"
<\$15\$@07=5<451<"1154516@4216152<"50%"=@5@07=6@1\$042[4<"608"<\$15\$1=@=16@6331\$61?2<"4\$"
28=1645\$06@12<2611?"

*fA-.R^%"50"_"A12<204645\$0"

!!"

#\$\$_%"&' T)"

+, -."G"*I=2"H@=2" * I568." \5L21<54EJD@K6@Q645\$0"608"/\$@6K\$1645\$0"50" R<4"/204=IE""
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A#-B-C*-#B."] \$0516""H?64461?61g22"608"#61?2@H21>\$_D6K6E"

GHB*#G/*."d=I%"505"312<204645\$0"504208<"4"<?"; 16<2"4?2"1?607507"064=12"\$9"28=1645\$0"50"
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; \$1@8"612"2%3\$; 2128"4"=<612"2610"608"71\$; "91\$%"261?"\$4?21"j ?64"5<"7@K6@Q645\$0"608"
; ?64"612"54<"67204<"4?64"?=\$8"=<1?"6"31\$%5<2"50"4?2"2E2<"\$9"=<%2"608"=<1?"6"4?1264"50"4?2"
2E2<"\$9"4?21<1"G"8\$%"50604"9264=12"\$9"7@K6@Q645\$0"5<"4?2"1\$002145\$0"K24; 220"859921204"
32\$3@J"K=<502<<1=@=12<"608"1\$=04152<"61\$=08"4?2"7@K20"D@K6@Q645\$0"12921<"0\$4"\$0@E"4\$"
41682"K=4"6@<"4"4?2"31268"9"5826<0"02; "1EK21"=<1524E"5<"1126428"; 54?"02; "1\$%-=05452<"
4?64"207672"50"4?251" \$; 0"31614512=<507"4?251" \$; 0"607=6720"21?0\$@7E"206K@2<"32\$3@2"4\$"
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61\$=08"4?2"; \$1@8"?"5<"112642"0\$; @2872"4160<921"1=@=16@4160<921"6"6172"; \$1@8_; 582"
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\$9"1?6@2072<"608"3\$; 21<J"K=4"KL5\$=<@E"; 54?"4?2"64421"=\$=4; 257?507"4?2"9\$1%21"j 2"2[3@12"
4?2"859921204"; 6E<"608"1\$08545\$0<="0821"; ?51?"1\$@6K\$1645\$0"4?15L2<"608"4=8E"4?2"
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1\$0<4I=1428"608"26<\$028"KE"4?2<2"=082056K@"; 508<"9"1?6072"4?64"K@"; "4\$"608"9I\$%"4?2"
%60E"504211\$0021428"1\$1021<"\$9"4?2"; \$1@8"

H+d."#61?2@608"] \$0516"612"1=11204@E"201\$@28"50"4?2"/154516@"/12645L2"608"/\$@6K\$1645L2"
+0m=51E"7168=642"31\$716%"64"Baef" #61?2@?6<")"E261<"2[32152012"4261?507"50"21\$0861E"
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608"720821"] \$0516"?6<; \$1>28"; 54?"4?2"50763\$12"] 505<41E"\$9"-8=1645\$0"9\$1"c"E261<"608"5<"
36<<5\$0642"6K\$=4"3?5@<"3?E"; \$1@8"42164=12"1\$70545L2"152012"3<E1?\$\$@7E"608"720821"
<4=852<"

*fA-.R^%"50"_"A12<204645\$0"

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A#-B-C*-#.G072@31224"B507?"

GHB*#G/*.] 60E"26I@E"1?5@8?\$\$8"28=164\$|<"6I2"961507"4?2"1?6@2072"\$9"; \$I>507"; 54?"
E\$=07"K5@07=6@1?5@8120"; ?\$<2"?\$\$%2"@07=672"608"1=@=I2"85992I<"<5705951604@E"9I\$%"4?25I"



4?50>507"608"4?20"4\$"2[3@\$12"?;\$ "4?25I"=082I<4608507<%57?4"K2"50427I6428"504\$%"%2605079=@
4261?507k@2610507"2[32I52012<0'*?5<; \$I>; 6<"K6<28"\$0"4?2"HI545<?"/\$@=%K56"] 505<4IE"\$9"
-8=1645\$0\<"a5I<4"A2\$3@2<"3I50153@2<"\$9@2610507"608"4?2"3I2<2042I<"\$07\$507"; \$I>"50"4?2"
<6%2"45%2"916%2"; 54?"4?2"+085720\$=<"A2I<32145L2<*261?2I"-8=1645\$0"] \$8=@"W+A*-] Z0j 2"
; 5@207672"50"60"504216145L2"3=K@1"856@\$7=2"6K\$=4"4?2"1\$@6K\$1645L2"3I\$12<<=<507"
8\$1=%204645\$0"91\$%"4?2"<21\$08"5421645\$0"\$9"4?2"1\$=I<2"4\$"5@=<41642"4?2"1?6@2072<"\$9"
K1587507"4?2<2"4; \$3\$; 2I9=@1=@4=16@3616857%<"608"@\$164507"6"<?6128<3612"91\$%"; ?51?"4\$"
%\$L2"9\$1; 6I8@506@EJ"; 2"; 5@85<1=<<4?2"1=1I204"633@1645\$0"\$9"B?5I@2EV<=082I<4608507<"
91\$%"4?5<1\$@6K\$1645\$0"50"?2I"; \$I>"6<"6<152012"4261?2I"64"60"6@210642"?57?"<1?\$\$@4?I\$=7?"
6"<1?\$\$@E618"761820"3I\$g2140



#\$%&' T)"

+, -."MA@=15@07=6<"50"] \$45\$ON.-0767507"\5L2I<2"/\$%%=05452<1"\\W3602@312<204645\$OZ"

A#-B-C*-#B."f=g6"\\F5607J"\\h\$51?5": 6<2E6%6J"\\F507", 5J"#?\\\$086"-18%60"\\F682": \$"
" " "d\\1760502I<k] \$82164\$1<."] 25@60"A@"-?@214"608", 26002"H\$<1?%60"

GHB*#G/*.*?2"A@=15@07=6<"50"] \$45\$0"W-?@214J")R&J"100"; ; ; 0%=@5@07=6@a\$1=%0\$17"Z"
3I\$716%"3I\$%\$42<"60"\$320"608%"2605079=@1\$%=%=051645\$0"9\$1"32\$3@"9I\$%"85L2I<2"
1\$%=%=05452<0"-%3@E507"6"-=1\$3260"1\$01234"\$9"3@=15@07=6@<%J"4?5<"50545645L2"2%3?6<502<"
4?2"5%3\$146012"\$9"3I\$%\$450



A#-B-C*-#."] 644?2; "F0'hI=721_#\$<<"

GHB*#G/*.*261?21<"6<"31\$92<<5\$06<"608"4261?507"6<"6"31\$92<<5\$0J"K\$4?"6<"K1\$68@E"8295028"6<"3\$<<5K@2"612"12<3\$0<5K@2"9\$1"11264507<"3612<; ?212"12@645\$0<?53<"K24; 220"4?2%<2@L2<J"4=8204<"608"4?2"4\$_K2_@261028"612<=33\$1428"608"0=14=1280*?2<2"12@645\$0<?53<"1\$0<454=42"6"4E32"\$9"; \$1@8"; 54?50"\$1"6<"@2610507"20L5I\$0%204<"\$%245%2<"12921128"4\$"6<"K=4"0\$4"4\$46@E"20163<=@428"KE"4?2"1=@4=12"\$9"6"1@6<<1\$%"G0812; "a220K217"6"3?5@\$<\$3?21"\$9"421?0\$@\$7E"; ?\$"1\$0450=2<"50"4?2"1154516@4168545\$0"\$9"?5<%204\$1"21K214"] 611=<2"617=2<"4?64": 25827721@<"315%61E"1\$0415K=45\$0"4"4?2"3?5@<\$3?516@4168545\$0"5<"?5<=0821<4608507"\$9" M; \$1@8N"608" M; \$1@8507N@] E"65%"; 54?"4?5<"364?"\$9"4?50>507"5<"4\$"82%"\$0<41642"?"; "4?2" L615\$=<"1\$%"3\$14%204<"4261?21<"3\$<<2<<J"2%K\$8E"608"612"9921"1\$0<58216K@E"%"12"31614516@633@1645\$0<"9\$1"4261?507"608"2610507"504"3?20%"20\$@\$7E"504\$"4?2"\$04\$@\$7E" \$9"4261?507"608"=@5%642@E"60"\$04\$@\$7E"4?64"160%"\$12"168516@E"509@=2012"28=1645\$0@ e0821<4608507"4?2"K2507"9"4261?507"6<; \$1@8507"160"6@<"71\$=08"4?2"31\$92<<5\$0"6<"6"31\$92<<5\$0"4?64"5<"?57?@E" L6@=28"608"82<21L507"9"12<3214@j" ?64"8\$2<"54%"260"4\$"K2"6"4261?21I"j" ?64"; 6E<"\$9"K2507"71\$=08"7\$\$8"4261?507I" *?2<2"612"0\$4"m=2<45\$0<"4\$"K2"60<; 2128"K=4"m=2<45\$0<"4\$"K2" @L280"

H+d." : =<K608"\$9@a128215>"] 644?2; "F0'hI=721_#\$<<"5<"6"8\$14\$16@<4=8204"50"A?5@\$<\$3?E"\$9" -8=1645\$0"64"B5%"\$0@a16<21"e05L21<54E@G9421"1\$%"3@24507"?5<"HB"50"] 588@2"D1682< -8=1645\$0"9I%"C/"B4642"e05L21<54E"50"] 6E")^"] 644?2; "<423328"504\$"4?2"1@6<<1\$%"64"/61\$@06" a15208<"B1?\$\$@60"50823208204"n=6>21<1?\$\$@50"\=I?6%"C\$14?"/61\$@06J"; ?212"2?46=7?4" %64?J%"= <51"608"421?0\$@\$7E"50"4?2%"588@2<1?\$\$@G9421"9\$=I"; \$08219=@E261<J?2"1?\$\$<2"4\$" @26L2"/aB"608"3=I<=2"68L60128"827122<"50"28=1645\$06@421?0\$@\$7E"3?5@<\$3?E"608"1154516@ <4=852<@+0"] 6E") R' J"] 644?2; "1\$%"3@2428"?5<"] 6<421<"\$9"B152012"50"+0<4I=145\$06@ *21?0\$@\$7E"64"C/"B4642"e05L21<54E"50"#6@257?J" C\$14?"/61\$@06@: 5<"4?2<5<; 6<"20454@28" *\$; 618"6" A12@%5061E"e0821<4608507"9"-8=164\$1@G<<=%345\$0<"GK\$=4" *21?0\$@\$7E"G"/6<2" B4=8E@] 644?2; \<"12<2611?"504212<4<"501@=82"3?5@<\$3?E"\$9"28=1645\$0J"3?5@<\$3?E"\$9" 421?0\$@\$7E"4160<9\$1%645L2"2610507"608"1154516@<4=852<@

*fA-.&^%"50" _



\$0@02"4=4\$1"608"<4=8204"4261?21<; ?\$"36145153642"50"4?2"856@\$7=2"K6<28"\$0@02"4=4\$156@160"
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GHB*#G/*.: \$; "8\$"; 2">%224"4?2"=05m=2"@2610507"0228<"\$9"=\$1"85L21<2"<4=8204"3\$3=@45\$01"
: \$; "8\$"; 2"4261?"50"; 6E<"4?64"20151?"608"82L2@3"4?2"5%6750645L2"163615452<"\$9"6@"
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W+-#DZ"<22>"4\$"60<; 21"W; ; ; 6217024"Z0"=I"615\$=<"31\$716%<"\$9\$1=<"\$0"5%6750645\$0\<"1\$@2"
50"6@@"2610507."611\$<<=Kg214"%64421"608"; 54?"6@672<"\$9"4?2"5<"312<204645\$0"+; 5@"
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W; ; ; 6217024k522"Z0"+0"++-4?2"65%"5<"0\$4"0@E"4\$"207672<4=8204<1"2%\$45\$0<"608"
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B=112E@+0", 2610507"50"\234?"+-J"4=8204<"?6L2"4?2"91228\$%"608"\$33\$14=054E"4\$"50L2<457642"
4\$351<"50>28"4"4?2"@"16@064=16@; \$1@8"50823208204@E@*?2E"612"=<33\$1428"50"@"2610507"
6K\$=4"6"507@2"4\$351"50"8234?"608"5826@E"6<"4?2E%"\$L2"4\$"D1682"R"; 5@?6L2"4?2"1\$0450=28"
\$33\$14=054E"4\$"8\$"<\$0", 2610507"50"\234?"\$1", 5\W; ; ; 6217024k, 5\ "Z"5<=0@>2"\$4?2!"
M50m=51EN"31\$g214"02"4E3516@E"22<"50"1?\$\$@<r 4?5<"2<<5\$0"; 5@50851642"54"=05m=202<<
608"54<"3\$420456@9\$1"=33\$14507"4=8204"@"2610507"608"1\$002145\$0"; 54?"4?2"@"16@064=16@
; \$1@8@"

H+d."D5@560"=F=8<\$0"5<"6"@"21"64"5%\$0@a16<21"e05L21<54E"50"HI545<?"/\$@-%K56J"/60686J"608"



/6068560"<\$1524E0"**?2"126<\$0<"K2?508"4?251"965@=12"; 54?"9\$1=<"\$0"502m=546K@2"12@645\$0<"\$9"
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H+d."/?=0[56\$": 2"5<"6"] 6<421"<4=8204"64"4?2"e05L21<54E"\$9"HI545<?"/\$@=%K56J">%6g\$1507"
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H61?2@I"827I22"50"/?506I"; 54?"%6g\$1"50"+042I0645\$06@#2@45\$0<@B?2"; \$I>28"6<"60"-07@<?"
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] \$?<20"] \$7?6886%"5<"6"7I68=642"<4=8204"<4=8E507"-8=1645\$06@*21?0\$@\$7E"608", 26I0507"



H26=8\$50"W')R&Z"31\$3\$<28"6"02; "916%2; \$1>"\$9"1\$70545L2%"21?605<%<="082I@E507"Bd0"
a1\$%"4?5<606@E<5<J"2"85<1\$L2128"4?2"3\$<<5K5@4E"\$9<=32I_<\$%0\$@204%"204645\$0f"
/\$0<2m=204@E"2"8215L28"02; "1@6<<2<"\$9"1\$70545L2"421?05m=2<4\$"821I26<2"Bd"64201E"
501@=8507"4?2"1\$70545L2"<?=99@2J"\$9"; ?51?"<2156@85L21<2"5%6750507"WB\+Z"5<"6"31\$%5<507"
<=K1@6<<0"

+0"4?5<312<204645\$0J"; 2"; 5@617=2"\$0"509\$1%645\$0_31\$12<<507"71\$=08<"4?64"4?2"1\$70545L2"
<?=99@2"421?05m=2<?=\$=@8"K2"<5705951604@E%"12"2992145L2"4?60"4?2"; 2@_2<46K@<?28"
W%\$0\$4\$0\$=<Z"5%6721E"421?05m=2"64"821I26<507"Bd"64201E" W] \$150J"RSTTZ0"j 2"; 5@K1529@E"
82<1I5K2"60"2[3215%204"K2507"3@60028"4\$"42<4"4?5<"E3\$4?2<5<"50"60"61682%51<2445070" *?2"
I2<26I1?"; 5@=45@Q2%"EB@223H=44\$0xJ"6"260"/\$7B15"G33</\$130"633"82<57028"4\$"W6Z"508=12"
<=32I_<\$%0\$@204%"204645\$0" L56"4?2"1\$70545L2"<?=99@2" W501@=8507"B\+Z"608"WKZ"206K@2<@23"
I2<26I1?2I<"4\$"32I9\$1%"@6172<16@2"2[3215%204<"608"1\$08=14"H57"\646"606@E<2<0"j 2"; 5@
I2@642"B\+4\$\$4?21"3<E1?\$\$7516@421?05m=2<W%60E"\$9"; ?51?"160"K2"=<28"50"1\$%K50645\$0"
; 54?"B\+Z0"j 2"; 5@85<1=<<"4?2"42<46K@2"5%3@1645\$0<"9\$B\+9\$1<4=8204<"608"961=@EV<
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#292I2012<"

H26=8\$50J", 0"A@W')R&Z0" *?2"3\$<<5K5@4E"\$9<=32I_<\$%0\$@204%"204645\$0."G"02; "509\$1%645\$0_
31\$12<<507"6331\$61?"4\$<@223_0<24"6112@21645\$0"608"50<\$%056"2[2%3@9528"KE<2156@85L21<2"
5%6750507" W] -#A#"23\$14"C\$0")R&b) &Z0"/\$70545L2"AI\$8=145L54E"#2<26I1?"AI\$g214" a61=@E"\$9"
-8=1645\$0" B5%\$0" a16<21"e05L21<54E0" Wc) "30"?443.kk<=%%540<9=016k542%kR' R c&"

: 61L2E" G0" D0" X" * 607J" C0" h0" f0" W')) & Z0"! ", #')) 7% (F% / + 7) " 32 (/ % 2 + & 5 (. " 2 (& 2) * + 250 # 0 " * #) + l (! + # (1 % (2 % 0 ' (5 % ' M (E 4 % % & (= % -) \$) # % (N % 7) % 1 < J " (W & Z) " & (b ' ^ ' 0 " 8 \$ 5 . R) 0 R) ^ & k < % I L 0 ')) ' 0) ' ^ ^ "

] \$150J"/0" X" G0I50J" C0": 0"WRSTTZ0" H2?6L5\$16@608"1\$70545L2"4I264%204<"9"721564I51"
50<\$%0560" / "32#+4"(.(! "#034')#, (+#-(! 4#) \$ +4(805\$/ "4", 5J" ^ " W^Z" (cT0"

H+d.", =1"A@H26=8\$50"5<"60"G8g=014"AI\$92<< \$1" \$9"-8=1645\$0": 2" < 32156@02<"50"4?2\$1E"608"
633@1645\$0<"9"6992145L2"1\$70545L2" < 152012": 5< / \$70545L2"AI\$8=145L54E" #2<26I1?"AI\$g214"
9\$1=<2<"0" < 2@_85121428" @2610507"608%"246_2992145L202<<"50">0\$; @2872"; \$1>2I<0": 2"5<"4?2"
6=4? \$1" \$9" / \$70545L2"AI\$8=145L54E." *?2" G14"608" B152012" \$9" e<507" h0\$; @2872"4\$" H21\$%2"



\$\$\$\$%&)S)"

+, -."j ?64\<@\$L2"7\$4"4\$\$8\$"; 54?"54I"/\$0%@14"\5L2I<54E"X"4?2"-08"\$9"4?2"j \$1@8"

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SEU



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