

8 U 'G6: 'X]Y 'F Y[i `]Y fi b[gVY\ ÒfXY b UV `Y\ b hž'`Y\ b h': HL 'G6: 'UV

I ba]hhY`VUf`bUWXXYa 'Ui g[YZU``YbY`bYi Y'?ca a YbhUfY'j cb: HL!; fØbXYf`GUa '6Ub_a Ub!: f]YX`VY_Ubbh`k i fXYbž`bU\a g]WX`XYf`bYi Y'79C'j cb': HL'Y]bYb`A ca Ybh`NY]hži a 'XUg I bhYfbY\a Yb'j ca 'Y\Ya U`][Yb'6ÒfgYbWXYZ'ni 'X]ghUbn]YfYb" ♣b'Y]bYa '♣hYfj]Yk 'a]h'J cl '_f]h]g]YfhY'6Ub_a Ub!: f]YX`X]Y 5i Zg]WX hgVY\ÔfXYb'i bX`XfØW_hY'gY]b'6YXUi Yfb'ØVYf'X]Y ♣bgc'j YbnUba Y`Xi b['Ui gž'k À\fYbX'Yf'X]Y'DfUI]g \Yfi bhYfgd]Y`hYž'?i bXYbj Yfa Ò[Yb'Ub'X]Y'GWXk YghYfZ]fa U 5`Ua YXU'FYgYUfWX 'ni 'j Yf'Y]\Yb"' / Ua d/, &&&/< Yff" 6Ub_a Ub!: f]YX`\Uh'_Y]bY'`Ui ZYbXY'Fc``Y'VY]'O HLQ HL'I G cXYf'5`Ua YXU'FYgYUfWX'@hX''i bX'gdf]WXh'b]WXh']b'XYfYb BUa Yb ž'hk]hhYfhY': HL!79C'≈\b'FUm'Ua 'A]hhk cWX''FUmg Hk YYh'_Ua 'XUbUWX'J cl'j YfOZZYbh`]WXh'GWfYYbg\chg'Y]bYf FY]\Y'j cb'Hk]hhYfl8]fY_hbUWXf]WXhYb'/ Ua d∧Y``]d/

I ba]hhY`VUf`bUW.XYa `Ui g[YZU``YbY`bYi Y`?ca a YbhUfY`j cb`: HL!; fØbXYf`GUa `6Ub_a Ub!: f]YX`VY_Ubbh`k i fXYbž'bU\a `g]W.`XYf bYi Y`79C`j cb`: HL`Y]bYb`A ca Ybh`NY]hži a `XUg`l bhYfbY\a Ybj ca `Y\Ya U`][Yb`6ÒfgYbW.YZ'ni `X]ghUbn]YfYb"

±b 'Y]bYa '±bhYfj]Yk 'a]h'J cl '_f]h]g]YfhY '6Ub_a Ub!: f]YX 'X]Y
5i Zg]Wk hgVY\ÒfXYb 'i bX 'XfØW_hY 'gY]b '6YXUi Yfb 'ØVYf'X]Y

±bgc 'j YbnUba Y 'Xi b['Ui gž'k À\fYbX 'Yf'X]Y 'DfUl]g'\Yfi bhYfgd]Y `hYž
?i bXYbj Yfa Ò[Yb 'Ub 'X]Y 'GWk YghYfZ]fa U'5`Ua YXU'F YgYUfWk 'ni
j Yf'Y]\Yb"'

 $< Yff"`6Ub_a~Ub!:~f]YX``\Uh'_Y]bY``Ui~ZYbXY`Fc``Y`VY]`O~HLQ~HL`I~G~cXYf`5`Ua~YXU`FYgYUfW\`@hX"`i~bX`gdf]W\h'b]W\h']b`XYfYb`BUa~Yb~ž~hk~]hhYfhY`:~HL!79C`<math>\approx$ \b`FUm`Ua~`A~]hhk~cW\"`

FUmg`Hk YYh`_Ua `XUbUW\`Jcl`j YfÒZZYbh`]W\h'GWfYYbg\chg`Y]bYf FY]\Y`jcb`Hk]hhYf!8]fY hbUW\f]W\hYb`jcb`6Ub a Ub!: f]YX"`

 $\label{lem:continuous} I \ bhYf`XYb`BUWXf]WXhYb`k Uf.``:```FY[i``UhcfYb"`G]Y`a UWXYb`U``Yg bcWX`gWX`]a a Yf"`G]Y`gWXØhnYb`X]Y`JYfVfUi WXYf`ØVYf\Ui dh`b]WXh"$

9f'gU[hY'Jcl'Ui W\ž'XUgg'Yf'Yg'VYfYi Yž'\pgc`j Ybn'Ub[Ya Y`XYhini\UVYbž'i bX'VYa Yf_hYž'XUgg'X]Yg' j]Y``Y]W\h'a Y]b'[fÒ»hYf 9]bnY`ZY\`Yf'k Uf"

< AhhY ']W\ 'XUg'b]W\ h'[YhUbž'k ØfXYb'5V\YVi b[Yb']b'Y]bYa 'A cbUh
a]h'j c``k Yfh][Yb'?i bXYb'VY[]bbYb ž'gU[hY'Yf"' 5VYf'ghUhhXYggYb
\UVY']W\ 'Y]b[YfY]W\ hž'i bX'X]Y'J YfUbhk cfh`]W\Yb'j Yfgi W\Ybž'U``Yg
Ui g'GW\Ua 'b]YXYfni VfYbbYb"'=\W\'_ca a Y'j]Y``Y]W\ h'bcW\ 'Xcfh\]bž
UVYf'bUW\ 'j]Y``a Y\f'?c``UhYfU`gW\AXYb"'I bX'bi f')\$#)\$"</pre>

8]Y Y][YbYb 5bk À`hY j cb 6Ub_a Ub!: f]YX _cbbhYb ZØf Y]bY GhY``i b[bU\a Y b]W\h'YffY]W\h'k YfXYbž gW\f]YV J cl "

FUmž'XYf'Ui W\'U`g'7\]YZ'FYghfi Whi f]b['CZZ]WYf'j cb': HL'Zi b[]Yfhž VYUi Zq]W\h][hY'j cf'\J\fYb'X]Y'@]ei]XUh]cb'XYg'VUb_fchhYb 9bYf[]Yi bhYfbY\a Ybgʻ9bfcb"'9f`k i fXY'Ua '%%"'Bcj Ya VYfʻ79Cž ni 'X]YgYa 'NY]hdi b_h'a Y`XYhY'X]Y'6ÒfgY'±bgc`j Ybn'bUW\'? Ud]hY` %%'Ub'i bX'6Ub_a Ub!: f]YX'hfUh'j cb'gY]bYa 'DcghYb'U`g'79C ni fØW_"

8]Y '5bk À`hY'j cb'@UbX]g'F Uh\ / '7cVV'i bX'Gi``]j Ub'/ '7fca k Y``ž X]Y': HL'i bX'j YfVi bXYbY'I bhYfbY\a Yb'j YfhfYhYbž'gU[hYb']b'Y]bYf \(\phigc`j Ybn'\formall Y[i b['Ua 'A cbhU[ž'XUgg'V]g'ni 'Y]bYf'A]``]cb ; `\(\alpha i V][Yf']b'XYb': \alpha``Yb'XYg'? Ud]hY`g'\%''[YbUbbh'k YfXYb _\(\alpha bhYb'' \)

6Ub_a Ub!: f]YX`\Uh`Ui W\`bUW\`gY]bYa `FØW_hf]hh`k Y]hYf`[Yhk]hhYfh"

♣b`gY]bYa `bYi YghYb`H\fYUX`Yfk À\bhY`Yfž`XUgg`: HL` ØVYfa Øh][
i bX`bUW\`Àgg][`k i fXYž`U`g`Yg`ni a `@]YV`]b[`XYg`G]`]Wcb`J U``Ym
k i fXY"

9f'Yf'YVhY'XYb'5Vghi fn'XYf''YhnhYb'K cW\Y'bcW\'Y]ba U'ž'bUW\XYa 6]bUbW!79C'7\Ub[dYb['N\Uc'gU[hYž'XUgg'gY]bY'6ÒfgY'VU'X <i bXYfhY'A]``]cbYb'8c``Uf']b': HLg'bUh]j Ya 'Hc_Yb': HH'UVk YfZYb k ØfXYž'U`g'FYU_h]cb'Ui Z'; YfØW\hY'ØVYf'X]Y' ≠ gc`j Ybn'j cb 5`Ua YXU'FYgYUfW\"'6]bUbW'gU[hY'XUbbž'Yg'd`UbYž': HL'ni ØVYfbY\a Ybž'VYj cf'Yg'g]W\'Ui Z[fi bX'j cb BUW\f]W\hYba Y'Xi b[Yb'ØVYf'a]gg\UbXY`hY'?i bXYb[Y`XYf'i bX a i ha U»`]W\Y'9fa]hhìi b[Yb'XYf'I G!6Y\ÒfXY 'ni fØW n]Y\Y''

&' Ł'I b[YZÀ\f'&) 'I 'XYg'?i bXYbj Yfa Ò[Ybg'k i fXYb'YXYb HU['UV[Y\cVYb''('A fX"'I G8"

K]Y 'g]W\ '\YfUi gghY``hYž'`U[']W\ 'ZU`gW\ . '8]Y '< YVY`k]f_i b[VYhfi ['b]W\ h'Yhk U') 'A]``]UfXYb '8 c``Ufž'gcbXYfb 'Yhk U'%' A]``]UfXYb '8 c``Uf"

%' 'A]``]UfXYb'8c``Uf'<YVY`k]f_i b[ž'hchU`Yf'Fi b'Ui Z'X]Y 6Ub_ž'hchU`Yf'Ni gUa a YbVfi W\'XYg'J Yfa Ò[Ybgk Yfhgž U``Yg'Ui Z'Y]ba U`"

 $K Yg \ U V G Y X Y Y X f_i b[b W h k c Y b''$

'G6: 'f4 G6: S: HLŁ'%* "'Bcj Ya VYf'&\$&&

8 Ug 'V Y f] W hY hY 'F Yi hY fg 'Ua 'GcbbhU['X Ugg 'a]b X Y gh Y b g '%

A] ``] Uf X Y 'I G!8 c `` Uf 'Ub ': HL!? i b X Y b [Y `X Y fb 'Z Y \ `h Y b ž 'b U W X Y a

6 Ub _a Ub!: f] Y X '%\$ 'A] ``] Uf X Y b 'I G!8 c `` Uf 'Ub '6 Y b i hn Y f [Y `X Y fb 'Ub

5 `Ua Y X U 'F Y g Y U f W 'Ø V Y fk] Y g Y b '\ Uhh Y "'D U fhb Y f 'X Y f '5 b k U `hg _Ub n `Y]

? `Y] b V Y f ['? Ud `Ub 'h Y] `h Y b '6 `c W_k c f _ g '_ Ø f n `] W 'a] h z X U g g 'X] Y 'j c b

: HL 'Y] b [Y f Y] W h Y b 'Y f g h Y b ' ± b g c `j Y b n U b h f À [Y 'Ui Z' b U W_h Y

? b c W Y b 'Y] b 'N Y] W Y b 'Z Ø f '5 fa i h 'g Y] b '_ O b b h Y b '9 f [Y V b] g 'Z Ø f

5 b `Y [Y f a] h Y] b [Y Z f c f Y b Y b '? c b h Y b 'i b X 'Ub X Y f Y b 'F] g] _ Y b 'Ub 'X Y f

6 O f g Y "

п - п

8 Yf'6Y]hfU['5g'G6:'8]ggYg'FY[i`Uhcfgž': HL'8]gck bg'G6:']gh'_Y]bY Z|bUbn]Y``Y'6YfUhi b["

8 Y hU]`g

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. '_fmd hc!bYk g"Uh