6fUX'D]hh'G\]bYg']b'A YI]Wc.'I bj Y]`]b['h\Y H\f]``g'cZ'': %''DfYa]YfY°

H\Y`\][\`m`Ubh]W]dUhYX`Z]`a / ei ch/: %\noting ei ch/: ghUff]b['6fUX D]hh`UbX`8Ua gcb`=\text{Xf}]g\noting dfYa]YfYg`]b`78A L`cb`\sibY`&*\noting &\noting \noting \no

7]i XUX XY A ÅI] Wc Ž A ÅI] Wc ! C b ¾ bY 1%\$ Ž & \$ &) Ž h\ Y j] V f U b h ghf Y hg c Z A Y I] Wc 7] hm V i nn Y X k] h\ 1 U b h] W] d U h] c b 1 U g h\ Y 1 d f Y a] Y f Y c Z h\ Y 1 \] [\mu k U] hY X 2] a 1 : % 1 hc c 1 d 1 U W Y 1 8] f Y W hY X 1 V m 2 g Y d \ ? c g] b g _] 1 U b X 2 Y U hi f] b [1 U g h U f ! g h i X X Y X 1 W U g h 1 Y X 1 V m 6 f U X 1 D] h h ž h\ Y Y j Y b h k U g 1 U a] I 1 c Z 1 \] [\h!\ Y U f h Y X a ca Y b h g 1 U b X 1 Y a c h] c b U 1 Y I W U b [Y g ž g \ c k W U g] b [1 h\ Y 1 \ U f X 1 k c f 1 h\ U h 1 \ U g 1 [c b Y 1] b h c 1 h\] g W] b Y a U h] W j Y b h i f Y 1 5 c b [g] X Y 1 D] h h ž 8 U a g c b 1 X f] g ž ? Y f f m 7 c b X c b ž U b X 1 d f c X i W f 1 X f Y a m ? Y] b Y f 1 [f U W X 1 h\ Y 1 d f Y g g 1 W c b Z Y f Y b W ž \] [\mathred{1} h] b [1 h\ Y 1 Z] a 1 h\ U h 1 U a g 1 h c 1 f Y] [b] h Y 1 h\ Y 1 Z Y f j c f 1 g i f f c i b X] b [a c h c f g d c f h g 1

: % 'hY``g`h\Y`[f]dd]b['ghcfmcZ'Gcbbm'< UmYgž'U``Y[YbXUfm cfai``U'%'Xf]j Yf``cc_]b['Zcf'fYXYadh]cb'UZhYf'U`\Uffck]b[
UWW]XYbh']b'h\Y'-\$g"'H\]fhm'mYUfg``UhYfž'\Y'fYWY]j Yg'U``]ZY!U`hYf]b[
cZZYf'Zfca`\]g'Zcfa Yf'hYUaaUhY'Fi VÅb'7Yfj UbhYgž'd`UmYX'Vm
*Jj]Yf'6UfXYaž'hc'fYhifb'hc'h\Y'fUWYhfUW_"'K]h\'fUWY'WUfg'UbX
UXfYbU`]bY'Uh']hg'WcfYž'h\Y'acj]Y'dfca]gYg'bch'cb`m'h\f]``]b[
UWh]cb'Vi h'U`gc'U'XYYd'X]j Y']bhc'h\YaYg'cZ'dYfgcbU`'fYXYadh]cb
UbX'WUaUfUXYf]Yž'Ug'Yad\Ug]nYX'Vm'dfcXiWYf'?`Y]bYf"'H\Y'Z]`ag
Yach]cbU`'XYdh\']g'dUfU``Y`YX'k]h\']hg'\][\!cWhUbY'fUW]b[
gYeiYbWYgž'dfca]g]b['Ub']aaYfg]j Y'YIdYf]YbWY'Zcf'j]YkYfg"

$7 Udhi f]b[h\ Y\ H\ f] c Z F UW]b[$

 $6 ch \ \ D] hh \ \ Ub \ X \ \ = \ \ Xf] g \ \ \ Uj \ Y \ \ b \ XYf[\ cb Y \ Y \ l \ h Y b g] j \ Y \ \ h f U] b] b[\ \ hc]$

 $\label{thm:ham:locality:loca$

 $5XX]h]cbU``m\check{z}'h\ Y`Z]`a g`Ui h\ Ybh]W]hm`]g`Vc`ghYfYX`Vm`h\ Y`]bWi g]cb cZfYU``fUW]b['hYUa g`UbX`Xf]j Yfgž'dfcj]X]b['U`VUW_Xfcd`h\ Uh g Vch\ 'fYU`]gh]WUbX`XmbUa]WU``m`Yb[U[]b["`5g`?cg]bg_]`dc]bhYX ci hž'h\ Y`Z]`a 'YbXYUj cfg`hc`WcbbYWh`k]h\ 'Ui X]YbWYg`h\ fci [\ i b]j YfgU``h\ Ya Yg`cZ`Ugd]fUh]cb`UbX`WcbZ`]Wh"`H\ Y`dfYdUfUh]cb`Zcf h\]g`fc`Y`gUk '<math>\Rightarrow$ Xf]g`bch`cb`m`dYfZYWh]b['\]g`Xf]j]b['g_]``g`Vi h`U`gc X]j]b[']bhc'j]XYc'[Ua Yg`hc`VYhhYf'[fUgd`h\ Y`dYfgcbU`\ Y`bYYXYX hc`Ya VcXm"

$H\setminus Y \cdot F \in UX \cdot 5 \setminus Y \cup X$

5g·Zcf·h\Y·dfYa]YfYž·]h·a Uf_YX·U·g][b]Z]WUbh·a ca Ybh·Zcf·6fUX D]hhž·k \c a UXY·ei]hY·h\Y·]a dfYgg]cb·Xi f]b[·\]g·dfca ch]cbU` UWh]j]h]Yg·]b·A YI]Wc"·H\Y·YI W]hYa Ybh·gi ffci bX]b[·· : % ·Vi]`Xg·Ug·]h dfYdUfYg·Zcf·]hg·h\YUhf]WU`·fY`YUgY·cb·¾ bY·&* ·Uh·7]bÅdc`]gž·k]h\ dfY!gU`Y·h]W_Yhg·U`fYUXm·Uj U]`UV`Y·ZcfYU[Yf·ZUbg"·K]h\·U·bUffUh]j Yh\Uh·cZZYfg·h\f]``g·cb·hfUW_'UbX`\YUfhZY`h·a ca Ybhg·cZZ·]hž·h\Y W]bYa Uh]WgdYWhUWY·]g·gi fY·hc·XfUk ·Wfck Xg·YU[Yf·hc·k]hbYgg·h\Y fYhi fb·cZ·Gcbbm′ < UmYg·UbX·h\Y·k cf`X·cZ·: cfa i `U·%·fUW]b["

Df]cf'hc']hg'fY`YUgYž'Ui X]YbWYg'\Uj Y'k]hbYggYX'gb]ddYhg'cZ'h\]g bU]`!V]h]b[''cifbYmž'ZcfYg\UXck]b[''U'Z]`a 'h\Uh']g'bch'4 gh'U'fUW]b[acj]Yž'Vi h'cbY'h\Uh'dfca]gYg'Yach]cbU`'fYgcbUbWY'UbX'U'W\UbWYUh'gYWcbX'W\UbWYg"'K]h\'h\Y'ghUf'dckYf'cZ'UWhcfg'`]_Y'D]hh'UbX6UfXYaž'Ui X]YbWYg'UfY'`cc_]b['ZcfkUfX'hc'Ub'Yb[U[]b['ghcfmh\Uh']cYg'VYmcbX'h\Y'Z]b]g\'`]bYž'UbX'hciW\Yg'h\Y'\YUfh"

 $5g^k Y^r f Y j^r i d^r Z c f^r : \% Z^r c b Y^r h \} b [^r] g^r W Y U f. ^h] g^r Z] ^a ^r] g b h^r ^r g h U b c h Y f^r f U W ^r c b^r h Y ^r W b Y a U h W M f W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h c^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h C^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h C^r \] [\ ^r] [\ h^r h \ Y \ W | h Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | a g^r h C^r \ Y | M Z^r | h^r U | A Z^r$

\ia Ub`gd]f]h`Ua]X`h\Y`fcUf`cZ`Yb[]bYg`UbX`h\Y`difgi]h`cZ`[`cfm" 6Y`gifY`hc`ghUm`hibYX`Zcf`k\Uh`Wci`X`VY`cbY`cZ`h\Y`XYZ]b]b[`Z]`agcZ`h\Y`mYUf"

8YhU]`g	
Cfh	7]iXUX:XY:AÅI]Wcž:AÅI]Wc
EiY``Yb	• dU`ca UmbUW\c"Wca
	• k k k "Y`]a dUfW]U`"Wca
	• k k k "dU[]bU%&"Wca "Uf

6Ygi WXYb G]Y i bg Ui Z. a Y]b!k]Yb bYh