

9bYf[]Y 7chhVig. BYiYf?UXYfd`UbYf Ybh\Ø``h'GWcih]b[!; Y\Y]a b]ggY°

A Ub]mY`BYf[]n'Yf`Ài hYfh'XUg'bYi Y'GWci h]b[!GmghYa 'j cb9bYf[]Y'7chhVi gž'XUg'Ui Z'XUhYb[YghØhnhYa 'i bX'@]j Y!GWci h]b['VUg]Yfh"



7 c hhVi gž'8 Yi hgW\`Ub X'!'8]Y'D`Ubi b[Yb'VY]'9bYf[]Y'7 c hhVi g `Ui ZYb'Ui Z'< c W\hci fYb "A Ub]mY`BYf[]nž'XYf'Yfgh'gY]h'5bZUb['XYg \sharp U\fYg'U`g'? UXYfd`UbYf'ZØf'XYb'8 f]hh`][]ghYb'hÀh][']ghž'\Uh'Zf]gW\Yb K]bX']b'X]Y'GWci h]b[!GhfUhY[]Yb'[YVfUW\h''=a = \sharp hYfj]Yk'a]h' HU[&('Yf_'Àfh'XYf'(&!;A\f][Yž'k]Y'Yf'Gd]Y`Yf'ZØf'X]Y'_ca a YbXY GU]gcb'Z]bXYh''

BYf[]nžj Yf\Y]fUhYhii bXighcinYfiJ UhYfij cbink Y]i?]bXYfbži\Uhini j cf U`gi7c!HfU]bYfii bXi5bU`mghi]bij YfgWX]YXYbYbiJ YfY]bYbi9fZU\fi b[[YgUa a YihžiXUfi bhYfiJ YfižiDUXYfVcfbži*b[c`ghUXhii bXiCgbUVfØW_" GY]bi5fVY]hgU``hU[i]ghi]biXfY]iD\UgYbii bhYfhY]ihiNi Yfghik]fXiY]bY XUhYbVUg]YfhYiJcfUi gk U\ii[YhfcZZYbži[YZci[hijcbiJ]XYc!GWcih]b[ibXigWXi]Yyi]WiXYa YbhgWXY]XYbXYbi@jjY!GWcih]b["i@jY! GWci h]b[']gh'ZØf'i bg'X]Y'k]Wkh][ghY'D\UgY ž'VYhcbh'BYf[]n"'N]Y`'gY] Ygž'a]bXYghYbg'XfY]a U`'dfc'K cWkY'VY]'Gd]Y`Yb'Ubk YgYbX'ni gY]bž'i a 'g]Wk'Y]b'6]`X'j cb'dchYbn]Y``Yb'BYi ni [Àb[Yb'ni 'a UWkYb"

8]Y: c_i g[YV]YhY:XYg:GWci h]b[!GmghYa g

 $FY[\]cbU``][\ Yb\ `\ UVYb\ 'ZØf'7chhVi\ g\ 'Y]bYb\ `\ c\ Yb\ 'GhY\ ``Ybk\ Yfh''\ BYf[\]n\ `\ Uh'VYfY]hg\ 'U``Y\ FY[\]cbU``][\ Yb\ 'gck\]Y\ 'j\]Y\ 'Y\ 'Gd\]Y\ 'Y\]b\ 'XYf''\ ''\ @[[\ U\ [\ Yg]Wk\ hYh''\ '8\ UVY]\ 'ghY\ ``h'Yf\ 'ZYghz'\ XUgg\ 'X]Y\ I\ bhYfgWk\]YXY\ ']a\ 'B\]j\ YUi\ XYf'FY[\]cbU``][\ Yb\ 'c\ Zh'ØVYfhf]YVYb\ 'k\ YfXYbz'VygcbXYfg\ 'X]Y\ FY[\]cbU``][\ U'6UmYfb\ 'i\ bX\ 'B\ cfX\ 'gWk\ bY]XYh'hYbXYbn]Y```gWk\ k\ ÀWk\ Yf\ UV'''\ 8Yf':\ c_i\ g``]Y[\ h'_`Uf'Ui\ Z'fY[\]cbU`Yb\ 'HU`YbhYbz'i\ a\ 'X]Y\ ZUa\]`]ÀfY 'B\ A\ Y'ni\ 'ZÒfXYfb\ z'Yf_`Afh'Yf''\ '9]b\ '5i\ gV`]W_'Ui\ Z\ 5i\ g`UbXga\ Af_hY'k\]Y\ 'Dc\ Ybz'HgWk\ YWk\]Ybz'^2\ ghYffY]Wk\ z'GWk\ k\ Y]n'i\ bX < c``UbX']gh'XYb_VUfz''YXcWk\ 'k\]fX'X]Yg'_i\ fnZf]gh][\ 'b]Wk\ h']b\ 'X]Y\ D`Ubi\ b[\ 'Y]bZ']Y\ Yb''$

5_hi Y``Y HfUbgZYfg i bX < YfUi gZcfXYfi b[Yb

K À\fYbX'BYf[]n'X]Y'Gd]Y`Yfgi W\Y'j cfUbhfY]VhžgW\Ui h'XYf'JYfY]b
Ui W\'Ui Z'X]Y'U_hi Y``Yb' < YfUi gZcfXYfi b[Yb'Ui Z'XYa
HfUbgZYfa Uf_h''K]Y'HfUbgZYfa Uf_h'VYf]W\hYhž'[]Vh'Yg
a ca YbhUb'k YXYf'Ni [Àb[Y'bcW\'5V[Àb[Y''HfUbgZYfg'g]bX']b
X]YgYf'D\UgY'V`cW_]Yfh'i bX'X]Y'G]hi Uh]cb'j cb'Gd]Y`Yfb'k]Y'G]`Ug
i bX'JU[bca Ub'[YghU`hYh'g]W\'gW\k]Yf]["'JYf`Yhni b[Yb'VY]
UbXYfYb'Gd]Y`Yfb'k]Y'DYfYUž'7\UgYž': U[\]f'i bX'GhYbnY`
gW\fAb_Yb'X]Y'K YW\gY`a Ò[`]W_Y]hYb'ni gÀhn`]W\'Y]b"

9bYf[]Y'7chhVi g'\Uh'bi b'XUg'N]Y`ž']a '_ca a YbXYb'\J\f'XYb Gdfi b[']b']bhYfbUh]cbU`Y'@][Yb'ni 'gW\UZZYbž']XYU`Yfk Y]gY']b'X]Y 9i fcdU'7cbZYfYbWY'@YU[i Y'cXYf'X]Y'9i fcdU'@YU[i Y'' K]f Yfk UfhYbž'XUgg'X]Y'\Y]» Y'D\UgY'ZØf'HfUbgZYfg'UV'9bXY'\;\)] VY[]bbYb'k]fX ž'gc'X]Y'9]bgW\Ahni b['j cb'BYf[]n"'CZZYbY 6Ui ghY``Yb'[]Vh'Yg']a 'XYZYbg]j Yb'A]hhY`ZY`X'i bX']a 'Ghi fa ž'k c J YfghAf_i b[Yb'bOh]['g]bX"

8]Y 'Gi W\Y 'bUW\ 'bYi Yb 'HU`YbhYb'i bX 'a Ò[`]W\Yb 'HfUbgZYfg'V`Y]Vh U`gc 'gdUbbYbXž'i bX 'X]Y '_ca a YbXYb'K cW\Yb'_ÒbbhYb $\label{thm:constraint} $$YbhgWXY]XYbX'ZØfX]Y'Ni_ibZh'jcb'9bYf[]Y'7chhVig'gY]b'''6]g'XU\]b$$V`Y]Vh'UVnikUfhYbž'kY`WXY'Gd]Y`Yf'g]WX'YadZY\`Yb'kYfXYb'ibXcV'X]Y'?UXYfd`Ubib['X]Y'f]WXh][Y'F]WXhib['Y]bgWX`A[h'']$$

8 YhU]`g	
Cfh	7 chhVigž8 YihgWX`Ub X
Ei Y``Yb	• k k k "hU[&("XY
	k k k "hfUbgZYfa Uf_h"XY

6Ygi WXYb G]Y i bg Ui Z. b!U["bYh