

6`i h][Y '9g_U`Uh]cb ']a '; UnUghfY]ZYb. '&+ HchY 'VY]'<]`ZggYbXi b[°

a ; UnUghfY]ZYb k i fXYb ``Ui h d U`Àgh]b Y b g]g W Y b `E i Y ``Yb `&+ A Y b g W Y b `VY] Y]b Y a `]g f U Y `]g W Y b `6 Y g W i gg `[Y h O h Y h '' 8 Y f J c f Z U `` Y f Y][b Y h Y g] W `b U \ Y `F U Z U \ ž k À \ f Y b X `g] W `N]j]`]g h Y b i a `\ i a Ub]h À f Y <]`Z Y `V Y a Ø \ h Y b " '8]Y `]g f U Y `]g W Y ·5 f a Y Y g d f] W h 'j c b 'Y]b Y f `6 Y X f c \ i b ["



FUZU\ž; UnUghfY]ZYbž:DU`Àgh]bU'! =a ; UnUghfY]ZYb'_Ua 'Yg
\Yi hY'ni 'Y]bYa 'gWk KYfYb'JcfZU``ž'VY]'XYa 'a]bXYghYbg'&+
DU`Àgh]bYbgYf'Xi fWk']gfUY`gWkY'Gc`XUhYb'[YhÒhYh'k i fXYbž'gc'X]Y
; Ygi bX\Y]hgVY\ÒfXY']b'XYf'j cb'<Ua Ug'_cbhfc``]YfhYb'FY[]cb''
Fi bX'-\$'kY]hYfY'DYfgcbYb'k i fXYb'j Yf`Yhnhž'Y]bYb'6Yf]Wkhj cb'
XYk YnYh"XY'ni Zc`[Y'YfY][bYhY'g]Wk'XYf'JcfZU``']b'XYf'BÀ\Y'Y]bYg
JYfhY]`i b[gnYbhfi a g'ZØf'\i a Ub]hÀfY'<]`ZY']b'XYf'gØX`]WkYb'GhUXh
FUZU\"

8 Ugʻ]gfUY`]gW\Y`A]`]hÀfʻ[UV`UbžʻXUggʻgY]bYʻGc`XUhYbʻni j cf K UfbgW\ØggY`UV[Y[YVYb`\ÀhhYbž'U`gʻg]Y`JYfXÀW\h][Y`VYa Yf_hYbž X]Y'g]WX'Y]bYf'XYf'<]'Zg[ØhYfghY``Yb'bÀ\YfhYb"'8]YgY'JYfXÀWXh][Yb\AhhYb'YXcWX'X]Y'j cf[YgY\YbYb'K Y[Y'j Yf`UggYbž'k À\fYbX'g]WXY]bY'[fc»Y'AYb[Y'N]j]']ghYb'Ui Z'XYb'fY[i `ÀfYb'Fci hYb'VYk Y[hY"8]Y']gfUY`]gWXY'5fa YY'VYghfY]hYh'XUg'[Yn]Y`hY'GWX]Y»Yb'Ui ZN]j]']ghYb'i bX'VYhcbhž'XUgg'N]j]']ghYb'b]WXh'XUfUb'[Y\]bXYfh k ØfXYbž'X]Y'JYfhY]`i b[gnYbhfYb'ni 'YffY]WXYb"'8Ug'A]`]hÀf'\Uh'X]Y 9]bnY`\Y]hYb'XYg'JcfZU``g'ni f'k Y]hYfYb'I bhYfgi WXi b[

<i a Ub]hAfY @U[Y i bX J YfhY] i b[j cb <] Zg[ØhYfb</pre>

 $8]Y `\ i \ a \ Ub]h A f Y `G]h i \ Uh]c b `]a \ ; \ Un Ughf Y]Z Y b `]gh `_Uh Ughf c d ` U ` ž k] Y 6 Y f]W h Y `j \ c b `n X Z ` Y i h Y "X Y ` V Y gh A h] [Y b " G Y]h `Ø V Y f `n k Y] `A c b Uh Y b Z]b X Y b `_Y]b Y `<] `Zg `]Y Z Y f i b [Y b `X i f W `X Ug `]g f U Y `]g W Y `A]`]h A f `gh Uh h ž k Ug `n i Y]b Y a `U_i h Y b `A Ub [Y ``Ub `@ Y V Y b ga]h h Y `b ž H f]b _k Ug g Y f `i b X A Y X]_Ua Y b h Y b `ZØ ` f h " \ \ \ \ \ \ \ a]h h Y b `X] Y g Y f `? f]g Y `d `Ub h `X] Y `b Y i [Y [f Ø b X Y h Y `; Un U '< i a Ub]h U f] Ub `: c i b X Uh]c b `f | < : L `X] Y `J Y f h Y]`i b [j c b '<]` Zg [Ø h Y f b `c ` b Y `N i h f]h `X Y f `< Ua Ug " 8] Y `; < : `g c ```a]h `I G! Ua Y f]_Ub]g W Y f `I b h Y f g h Ø h n i b [`Uf V Y]h Y b `i b X `k i f X Y `j c b `d f]j Uh Y b G] W Y f `Y]h g _f A Z h Y b ž Y \ Y a U`] [Y b `G c `X Uh Y b `i b X `J Y f h f Y h Y f b `j c b <]` Zg c f [Ub]g Uh] c b Y b `[Y [f Ø b X Y h "$

 $\label{thm:conv:linear:conv:$

=bhYfbUh]cbU`YgibX'dc`]h]gWXYgIaZY`X

Y]bY'gcZcfh][Y'i bX'i bUV\Àb[][Y'I bhYfgi Wki b['XYf'9fY][b]ggY i bX'nY][hY'g]Wk 'YbhgYhnh'ØVYf'6Yf]Wk hY'j cb'n]j]'Yb'CdZYfb"'8]Yg [YgWk]Y\h'j cf'XYa '<]bhYf[fi bX'Y]bYg'g]Wk'ni gd]hnYbXYb ?cbZ']_hgž'XYf'Ua '+"'C_hcVYf'&\$&' 'VY[Ubb'i bX'gY]h\Yf'j]Y`Y @YVYb'[YZcfXYfh'\Uh"'6]g'ni 'X]YgYa 'NY]hdi b_h'k i fXYb']b'XYb ?Àa dZYb'ØVYf') ("\$\$\$'DU'Àgh]bYbgYf'[YhÒhYhž'XUfi bhYf'j]Y`Y N]j]']ghYb"

8]Y'G]hi Uh]cb'V`Y]Vh'Ub[YgdUbbhži bX'X]Y']bhYfbUh]cbU`Y; Ya Y]bgW\UZh'VYcVUW\hYh'X]Y'9bhk]W_`i b[Yb']a '; UnUghfY]ZYb'a]h Gcf[Y"'6YcVUW\hYf'k UfbYb'j cf'XYb'?cbgYei YbnYbž'gc``hYb'X]Y\i a Ub]hÀfYb'6YX]b[i b[Yb'b]W\h'gW\bY``gh'a Ò[`]W\j YfVYggYfh i bX'X]Y'N]j]`VYj Ò`_Yfi b['VYqqYf'[YgW\Øhnh'k YfXYb"

8]Y'G]hi Uh]cb']a'; UnUghfY]ZYb'V`Y]Vh'Ub[YgdUbbh'i bX'X]Y\ia Ub]hÀfY'?f]gY'ghY``h'Y]bY'XYf'[fÒ»hYb'<YfUi gZcfXYfi b[Yb']bXYfFY[]cb'XUf"'8Yf'Y]b[YgWXfÀb_hY'Ni [Ub['ni'<]`ZY'i bX'X]Ya]`]hÀf]gWXYb'5i gY]bUbXYfgYhni b[Yb'gYhnYb'N]j]`]ghYb'k Y]hYfi bhYf'8fi W''

@YgYb'G]Y'a Y\f'ØVYf'X]Y'9fY][b]ggY'i bX'k Y]hYfY'9bhk]Wi b[Yb Ui Z'fU]bYk g"]h"

8YhU]`g	
JcfZU``	6YgWi gg
Cfh	FUZU\ž'; UnUghfY]ZYbž'DU`Àgh]bU
J Y f`Y hnhY	- \$
EiY``Yb	• k k k "XYk YnYh"XY

8 YhU]`g	
	k k k "fU]bYk g"]h
	• k k k "nXZ\Yi hY"XY

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