

## JYf\_Y\fgWXUcg`]b`6Ui bUhU`. 6Ui ghY``Yb gcf[Yb ZØf Gca a YfghfYgg°

6Ui bUhU`'Yf`YVh'Gca a YfVUi UfVY]hYb.

J Yf\_Y\fgY]bgW\fÀb\_i b[ Ybž'GUb]Yfi b[ Yb'i bX'9fgUhnj Yf\_Y\f
ZØf'GhfU» YbVU\b`]b]Y') 'gcf[ Yb'ZØf'I a `Y]hi b[ Yb"



6Ui bUhU`ž'8 Yi hgWX`Ub X '! '9]b '\Y]» Yf 'Gca a Yf 'ZØf 'X]Y

J Yf\_Y\fghY]`bY\a Yf ']b '6Ui bUhU`. '5\_hi Y```gcf[ Yb 'i a ZUb[ fY]WXY

6Ui ghY``Yb 'ZØf 'a Ugg]j Y '9]bgWX fÀb\_i b[ Yb 'i bX

< YfUi gZcfXYfi b[ Ybž'X]Y 'X]Y 'A cV]`]hÀh ']b 'XYf FY[ ]cb 'ghUf\_

VYY]bhfÀWX h][ Yb "@Ui h' < Ygg]gWX Y#B ]Y XYfgÀWX g]gWX Y

5``[ Ya Y]bY 'ghY\Yb ']bgVYgcbXYfY 'X]Y '6Ui UfVY]hYb 'Ub 'XYf

I `a YbghfU» Y ']a 'A ]hhY`di b\_hž'X]Y 'b]WX h'bi f 'GhfU» Ybj Yf\_Y\fž
gcbXYfb 'Ui WX 'XYb 'ÒZZYbh`]WX Yb 'BU\j Yf\_Y\f'Ui Z'X]Y 'DfcVY 'ghY``Yb"</pre>

K À\fYbX'XYf'Gca a YfZYf]Yb'ZØ\fh'< YggYb'A cV]`'[Ya Y]bgUa 'a ]h XYf'FY[]cbU`VU\b'?UggY`'fF6?Ł'i a ZUb[fY]W\Y GUb]Yfi b[gUfVY]hYb'Xi fW\"'8Ug'VYhf]ZZh'j cf'U``Ya 'X]Y'9fbYi Yfi b[ XYf'; `Y]gUb`U[Y'nk]gW\Yb'A UhhYbVYf['i bX'6Ui bUhU`ž'X]Y'XYb 5i ghUi gWX 'U`hYf' < c`ngWX k Y``Yb [ Y[ Yb'a cXYfbY'6YhcbgWX k Y``Yb i a ZUggh"'Ni XYa 'Yf\À`h'X]Y'I `a YbghfU» Y'bYi Y'GhfU» YbVU\b[ `Y]gY i bX'Y]bY'i a ZUggYbXY'5gd\U`h]Yfi b[ "'I a 'X]Y'G]WXYf\Y]h'i bX E i U`]hÀh'ni '[ Yk À\f`Y]ghYbž'k ]fX'XYf'5gd\U`h']a '?fYi ni b[ gVYfY]WX V]g'ni '' & 'Wa ']b'XfY]'@U[ Yb'YfbYi Yfh"

## JYf\_Y\fgY]bgW\fÀb\_i b[Yb i bX l a `Y]hi b[Yb

8]Y '6Ui ghY ``Yb 'k]f\_Yb 'g]WX 'ghUf\_'Ui Z'XYb 'J Yf\_Y\fgZi gg'Ui g.

HÀ[ `]WX 'g]bX 'Yhk U'%\$"\$\$\$ '5i hcg'Ui Z'X]YgYf'k]WX h][ Yb 'J YfV]bXi b[
i bhYfk Y[ g"'I a 'XYb '8i fWX [ Ub[ gj Yf\_Y\f'ni '`Y]hYbž']gh'Y]bY
I a `Y]hi b[ 'ØVYf'X]Y '5i hcVU\b'(-'fb(-Ł'Y]b[ Yf]WX hYhž'k cVY]'X]Y

5bgWX `i ggghY``Yb '6Ui bUhU`!A]hhY 'i bX '6Ui bUhU`!BcfX'ghUf\_
ZfYei Ybh]Yfh'k YfXYb"'<]Yf'\_Ubb'a Ub'g]WX 'Ui Z'Y]b'Yf\Ò\hYg

J Yf\_Y\fgUi Z\_ca a Yb'Y]bghY``Ybž']bgVYgcbXYfY'Xi fWX 'X]Y

A Uf\_]Yfi b[ 'Y]bYf'Xf]hhYb': U\fgdi f'nk]gWXYb'6Ui bUhU`!BcfX'i bX
6Ui bUhU`!A]hhY"

## =bj Ygh]h]cbYb i bX nY]h`]WXYf FU\a Yb

8]Y = bj Ygh]h]cbYb ZØf X]YgY i a ZUb[fY]WXYb 6Ui UfVY]hYb g]bX b]WXh i bYf\YV ]WX. Fi bX - &) "\$\$\$ 9i fc Z]Y » Yb ]b X]Y 9fbYi Yfi b[ XYf @UbXYgghfU » Y " 8]Y ? cghYb ZØf X]Y GUb]Yfi b[ XYf GhfU » Yb VU\b[ Y]gY VY `Ui ZYb g]WX `Ui ZYhk U ZØbZ A]``]cbYb '9i fc k cVY] XUg @UbX < YggYb V]g ni '( ž&) 'A]``]cbYb '9i fc ni f': ÒfXYfi b[ VYfY]hghY ``h" 8]YgY AU » bU\a Yb 'gc ``Yb 'b]WXh bi f'X]Y 'G]WXYf\Y]h Yf\Ò\Yb z 'gcbXYfb 'Ui WX 'X]Y '@YVYbgei U`]hÀh ]b 'XYf 'FY[]cb j YfVYggYfb"

 $< U `hYghY ``Yb `` 5bbY!: fUb_!GhfU ``Y '`i bX ``K ]` `\Y`a !6i gWX!GhfU ``Y '`]b XYf `@Yi gWX bYfghfU ``Y '`gck ]Y 'X]Y '[ Yd `UbhYb '5fVY]hYb `Ua GWXY]XYa Ubbd `Uhnž 'gcf[ Yb 'nY]hk Y]gY 'ZØf 'ni gÅhn`]WX Y 9]bgWX fÅb_i b[ Yb ']a '^2 DBJ "'8]Y 'I a `Y]hi b[ Yb 'i bX '< Yfb]WX hi b[ Yb XYf '< U`hYghY ``Yb 'g]bX 'UV 'XYa ') "'$\iny \]'V]g 'ni a '\&+\"'\iny \]'YfZcfXYf`]WX ž k Å\fYbX 'ni gÅhn`]WX Y '? UbU`UfVY]hYb ']b 'XYf 'GhUXh'j ca ') "'$\iny \]'V]g %+\"'5i [ i gh 'ZØf 'k Y]hYfY '6YY]b hfÀWX h][ i b[ Yb ']a 'A ]hhY`f]b[ 'gcf[ Yb _\ObbhYbž'k ]Y '\forall J'; 'VYf]WX hYh''$ 

± XYf`\Yi h][Yb`NY]h`]gh`Yg`k]W\h][ž'ØVYf`JYfÀbXYfi b[i bX < YfUi gZcfXYfi b[Yb`[i h`]bZcfa]Yfh`ni 'gY]b": Øf`Y]bY`fUgW\Y
D`Ubi b[i bX`U`hYfbUh]jY`Fci hYb`gc``hYb`DUggU[]YfY`^YXYfnY]h
U\_hi Y``Y`±bZcfa Uh]cbYb`UVfi ZYbž`Yhk U`ØVYf`X]Y`K YVgY]hY`XYf

2 66ži a 'g]W\`Ui Z'Yj Ybhi Y``Y`k Y]hYfY`6Ui ghY``Yb`Y]bghY``Yb`ni
\_ÒbbYbž'k]Y`g]Y`]b`]\fYf`: U\fd`UbØVYfg]W\h`\_ca a i b]n]Yfh`g]bX"

 $\label{thm:continuity:continuit$ 

8 YhU]`g	
Cfh	6UibUhU`ž'8YihgW\`UbX
EiY``Yb	• k k k "\bU"XY
	• k k k "_j [ "XY
	• k k k "cYVV"Uh

6 Ygi WX Yb 'G]Y i bg 'Ui Z 'bU[!\YggYb"XY