

J 6G: `cf]XgXcfZ'UbX: UW'Ghfcb[dUfhbYfg\]d'Zcf'mcib['ZcchVU``

J 6G': `cf]XgXcfZ'WccdYfUhYg'k]h\ 'h\ Y': 57 'hc'dfca chY'mci b[ZcchVU```hU`Ybhg'UbX'Yl dUbX']hg'hfU]b]b['cZZYf']b'J]YbbU"



 $: `cf] XgXcfZ'^2 ghYffY] W `!`H\Y`WccdYfUh] cb`VYhk YYb`J 6G \\ : `cf] XgXcfZ'UbX': `cf] XgXcfZYf`5h\`Yh] WGdcfhg`7`i V`fl 57Ł'dfca]gYg hc`Vf] b[`U`ZfYg\`U] f`hc`h\Y`dfca ch] cb`cZ'mci b[`hU`Ybh`] b`ZcchVU``" Cb`$\delta bY`%$\delta &\delta \delta \de$

"H\]g'dUfhbYfg\]d']g'j U`i UV`Y'gi ddcfh'Zcf'h\Y'gW\cc`'YXi WUh]cb'cZ ci f'd`UmYfgž"'gU]X'@i=Ug'A cgYfž'h\Y'mci b['a UbU[Yf'cZ'h\Y': 57"

<Y'dc]bhYX'ci h'h\Uh'gYj YfU``hU`Ybhg'cZ'h\Y': 57žk\]W\'\Uj Y
U`fYUXm'VYYb'gi WW'ggZi ``m'UWh]j Y']b'5i ghf]Ufg'gYWcbX'\][\Ygh
X]j]g]cbž'j]g]h'h\Y'J]YbbU'6i g]bYgg'GW\cc`': `cf]XgXcfZ"'H\YgY'U`gc
]bWi XY'dfca]bYbh'd`UmYfg'gi W\'Ug'2: 6'bUh]cbU`'d`UmYf'A Uf_c
5fbUi hcj]WUbX'h\Y'I &%']bhYfbUh]cbU`'C`i k UgYi b'5XYk i a]"'</pre>

`]bbcj Uh]j Y`hfU]b]b['dUh\g`

TH\Y'J 6G:: `cf]XgXcfZ'hfU]b]b['cZZYf'YI hYbXg'ZUf'VYmcbX'h\Y
ZcchVU```dUfhbYfg\]d": fca 'h\Y'gW\cc``mYUf'&\$&(#\&) \(\tilde{x}\)h\Y'bYk
"7ca a YfW]U`'5WUXYa m'Zcf'GYW' f]hm'A UbU[Ya Ybhz'7mVYf'GYW' f]hm
UbX'Di V`]W5Xa]b]ghfUh]cb"'fl7mVYf\U_Ł'k]``'VY'cZZYfYX"'H\]g
]bbcj Uh]j Y'hfU]b]b['Wca V]bYg'VUg]WYWcbca]WhfU]b]b['k]h\
gdYW]U`]nYX'WcbhYbh']b'WmVYf'gYW' f]hm'UbX'di V`]WUXa]b]ghfUh]cb"
H\Y'U]a ']g'hc'bch'cb`m'Wcbj Ym'gi V'YWh'!gdYW]Z]W_bck `YX[Y'hc'h\Y
ghi XYbhg.'Vi h'U`gc'Wca dYhYbW]Yg'h\Uh'h\Ym'X]gW\Uf[Y'X]fYWh`m
]bhc'h\Y'dfcZYgg]cbU`'k cf`X"'

 $\label{eq:continuous_continuous$

YIYa dh]cbg UbX Zi hi fY dfcgdYWhg

 $\label{thm:hamiltonian} $$ J_6G: \cf] XgXcfZ: cZYfg: \cf \cdot \$

 $\label{thm:condition} $$ 'H\Y'Z bX'cZ'h\Y'J]YbbYgY'a YfW.Ubh'hYUa ž'k \]W.'cdYfUhYg'U hchU``cZ'g]I 'gW.cc```cWUh]cbg'k]h\'Ufci bX'' ž, $$ 'ghi XYbhg.']b'h\Y$

]bg]XYžgYYg'Zi hi fY'!cf]YbhYX'XYj Y`cda Ybh']b'h\]g'WccdYfUh]cb"

K]h\'U'k]XY'fUb[Y'cZ'hfU]b]b['cZZYfg'fUb[]b['Zfca 'hfUXY

UWUXYa]Yg'hc'Wca a YfW]U`'gW\cc`g'UbX'Wcbghfi Wh]cb'Wci fgYgž

h\Ym'Xc'[ccX'Vi g]bYgg'Zcf'h\Y'YXi WUh]cb'UbX'dfca ch]cb'cZ'mci b[
hU`Ybhg']b'J]YbbU"'

8YhU]`g	
Cfh	: `cf]XgXcfZž ^{·2} ghYffY]WX
EiY``Yb	• k k k "chg"Uh
	Z`cf]XgXcfZ"j Vg"UWUh

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