PTRL4024

8f]``]b[': `i]Xg'UbX'7Ya Ybh]b[



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K. <u>k k k "Yb[]bYYf]b["i bgk "YXi "Ui #a</u>]bYfU`g!YbYf[mfYgci fWg

7ci fqY^{*}8YHJ^{*}q

[b]hg'cZ'7fYX]h'*'

UbX Wa Ybhb [``UVcfUhcfm'

7 ci fqY @YUfb]b[Ci hWca Yq

7 ci fqY⁻5]a q

Gi a a UfmcZh Y 7 ci fqY

@YUfb]b['CihWca Y 95 GHU Y %7 ca dYhYbWYg %"8Yq][b'UbX'Y]U`iUhY'Xf]``]b['Zi]X'dfc[fUa'UbX'WaYbh]b[D9%"%ZD9%"' ZD9&"%ZD9&"' Z cdYfUh]cbg`i bXYf`gdYW]Z]Wk Y```WcbX]h]cbg D9' "%žD9' "* &"DfYdUfY'UbX'hYghXf]``]b['Zi]Xg'UbX'WYa Ybh]b['g`i ffmUVWcfX]b[D9%"%ŽD9%"' ŽD9&"(ŽD9' "&Ž D9' "* $hc^{-}5D = ghUbXUfXg$ '"'Cdh]a]nY'Xf]``]b['Zi]X'\mXfUi`]Wg'Zcf'\][\'fUhY'cZdYbYhfUh]cb'UbX D9%"% D9%" & D9%" ZD9&"% Wilhib[gilfUbgdcfhUhjcbYZ]WYbWn

\mXfUi `]Wg`UbX`WYa Ybh]b[`hYW\b]ei Y`UbX`hc`Udd`mh\Y`h\Ycfmhc`h\Y`XYg][bžYj U`i Uh]cb`UbX`cdh]a]nUh]cb`cZ

H\Y'Wci fqY'Wcj Yfq'Vch\'h\Y'h\YcfmUbX'dfUWfWU`'Udd`]WUhcbg'cZXf]``]b['Zi]Xg'UbX'k Y``

WaYbhb['hYWxbc`c[m"H\Y`aU]b'hcd]Wg`]bWiXY.h\Y`ZbWhjcbgžWcadcg]hjcb'UbX'UXX]hjjYg`cZXf]``]b['Zi]Xg/

WUmUbX'dc`maYf'WXYa]qlfmUbX'Udd`]WUh]cbg']b'Xf]``]b['Zi]Xq/Xf]``]b['Zi]X'XYbq]miXYhYfa]bUh]cb'UbX WUW `Uhcbg/Xf]``]b['Zi]X'Z]`hfUhcb'UbX'a i X'WU_]b['dfcWygg/5D=Xf]``]b['Zi]X'dfcdYfhYgžYei]da YbhUbX h/gh/b['dfcW/Xi fYg/W/Ya]WU``UbU`mg]g/Xf]``]b['Zi]X gmgh/a 'XYg][b'Zcf'Wcblfc``Zcfa Uh/cb'XUa U[Y'UbX kY``VcfY`qHUV]`]hm/Xf]``]b[`Zi]X`\mXfUi`]Wq`UbX`W`Hib[q`HUbqdcfHUH]cb/WYaYbhaUbiZJWifYžWcadcq]h]cb

UbX gHUbXUfX]nUhcb/Wa YbhUXX]hj Yg/Wa Ybhqi ffmf\Yccc[mdfcdYfhYg/5D=Wa Ybhb[Hyghb[Yei]da YbhUbX`dfcWfXi fYg/Wfa Ybhg`i ffmXYg][b`UbX`WU`W`Uhcbg/a i X`fYa cj U``VmWfa Ybh'[Ug a][fUhlcb/WfaYbhlb[Yei]daYbhUbXidfcWfXi fYq/dcqh/cV/Wcbq]XYfUhlcbg'UbXYj U`i Uhlcb/Xf[``]b['Zi]Xq

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Xf]``]b['Zi]X'dfc[fUa ž'Xf]``]b['\mXfUi `]Wg'UbX'WYa YbHb['cdYfUHcbg"

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GHJfh'XUHY. K YY_'% Gi Va]gg]cb'bchYg. Cb`]bY'A ccX`Y'Gi Va]gg]cb 8i Y'XUHY. K YY_''

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5ggYgga Ybh& 5gg][ba Ybh& A i X k Y][\hWU`W` `Uh]cbg UbX 5D=dfcdYfh]Yg

GHJfh'XUHY. 'K YY_'' Gi Va]gg]cb'bchYg. 'Cb`]bY'gi Va]gg]cb 8i Y'XUHY. 'K YY_')

A i X k Y][\hWD W `Uh]cbg UbX 5 D=dfcdYfh]Yg

5ggYgga Ybh'. 5gg][ba Ybh'. 8f]``]b[`\mXfUi `]Wg'UbX'W H]b[g'HfUbgdcfHUh]cb

GHJfhXUHY. K YY_'+ Gi Va]gg]cb'bchYg. Cb`]bY'gi Va]gg]cb 8i Y'XUHY. K YY_',

8 f)``]b['\mXfUi `]Wg

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	Hi hcf]U`	7 Ya Ybhjb[`WU`W `Uhjcb	
	@UVcfUhcfm	@UV`(`!`8f]``]b[`:`i]X`7\Ya]WU``5bU`mg]g`6	
K_YY_`%\$.`%) `Bcj Ya VYf !`%-`Bcj Ya VYf	@YWhifY	; Ugʻa][fUh]cbžʻ7Ya Ybh]b[Yei]da Ybh'7Ya Ybh d`UVWa YbhUbX'dcgh'cV'Yj U`i Uh]cb"	
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Gi Va]gg]cb cZ5ggYgga YbhHUg_g

H\Y'GW\cc``\Ug'XYjY`cdYX'U'[i]XY`]bY'hc'\Y`d'mci'k\Yb'giVa]hhjb['U'WcifgY'Ugg][baYbh'

K Y YbWci fU[Y mci 'hc'fYhJ]b'U'WcdmicZYj YfmUgg][ba Ybhigi Va]hhYX'Zcf'UggYgga YbhZcf'mci f'ck b'fYWcfX Y]h\Yf']b'\UfXWcdmicf'Y'YWfcb]WZcfa "

5```UggYgga Ybhg`a i gh\Uj Y`Ub`UggYgga YbhWcj Yf`g\YYhUHUWXYX"

7cifgY'Wcad`Yh]cb

7 ci fgY Wea d`Yhjcb`fYei]fYg`gi Va]gg]cb`cZU```UggYgga Ybh`]hYa g"`: U]`i fY`hc`gi Va]hU```UggYgga Ybh`]hYa g a UmfYgi `h`]b`h\Y`Uk UfX`cZUb`I bgUhjgZUWcfm: U]`i fY`fI : Ł`[fUXY`Zcf`h\Y`7 ci fgY`i b`Ygg`gdYWjU` Webg]XYfUhjcb`\Ug`VYYb`gi Va]hhYX`UbX`Uddfcj YX"`D`YUgY`bchYž`U`Wea dYhYbWm\i fX`Y`cZ) \$i ``]g`Udd`]YX`hc h\Y`ZjbU``UggYgga Ybh'

@UhY Gi Va]gg]cb cZUb 5gg][ba Ybh

: i ```a Uf_g`Zcf`Ub`Ugg][ba YbhUfY`cb`mdcgg]V`Y`k \Yb`Ub`Ugg][ba Ybh`]g`fYWY]j YX`Vmh\Y`Xi Y`XUhY''`

K Y'i bXYfgHUbX'h\Uh'Uh'h]a Yg'mci 'a Umbch'VY'UV'Y'hc'gi Va]h'Ub'Ugg][ba Ybh'cb'h]a Yž'UbX'h\Y'GW\cc``k]`` UWWca a cXUhY'UbmZU]f'UbX'fYUgcbUV'Y'YI hYbg]cb"'K Y'k ci `X'fYWca a YbX'mci 'fYj]Yk 'h\Y'I BGK 'GdYW]U` 7 cbg]XYfUh]cb'[i]XY`]bYg'-'gYY'gYWf]cb'VY`ck "

@UhY`gi Va]gg]cb`k]```bchVY`UVWYdhYX`UbX`k]```VY`Wcbg]XYfYX`Ug`bc`gi Va]gg]cb"

GdYWJU``7cbg]XYfUh]cb

 $\label{eq:linear_constraint} \begin{aligned} & \mathsf{Nci}^{\mathsf{Wb}} Udd`mZcf`gdYW]U``Wcbg]XYfUH]cb`H\fci [\`<u>H\Y`Bi WYi g`Gh XYbh<i V</u>`k \Yb`]``bYgg`cf`cH\Yf W]fW a gHUbWfg`]bHYfZYfY`k]h`mci f`UggYgga YbhdYfZcfa UbWf"`G]W_bYggž`a]gUXj Ybh fY`cf`cH\Yf W]fW a gHUbWfg`VYmcbX`mci f`Wcbhfc``a Um$

- DfYj Ybhimci Zfca 'Wca d'Yhjb['U'Wci fgY'fYei]fYa Ybh
- ? YYd mci Zfca UthYbX]b[UbUggYggUVYYUWjj]m
- Ghcdimci igi Va]hh]b[iUggYggUV'Yik cf_'Zcf'U'Wci fgY
- G][b]]WUbhmUZYWhinci f`dYfZcfa UbW`]b`UggYggUV`Y`k cf_žVY`]hU`Zcfa U``YbX!cZgYa YghYf YI Ua]bUh]cbž`U`WUgg`hYghž`U``UVcfUhcfmhYghž`U`gYa]bUf`dfYgYbhUh]cb`cf`Ubmch\Yf`Zcfa `cZ UggYgga Ybh

K Y`Ug_`h\Uhimci `d`YUgY`WebhUWih\Y`7 ci fgY`7 cbj Ybcf`]a a YX]UhY`mcbWY`mci `\Uj Y`Wea d`YhYX`h\Y`gdYW]U` Webg]XYfUh]cb`Udd`]WUh]cbžbc``U]\Yf`h\Ub`cbY`k YY_`Zca `gi Va`]gg]cb"#

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Mci f``YWi fYf'UbX'h\Y'I b]j Yfg]mik]``YI dYWimci f`gi Va]htYX'Ugg][ba Ybhg`UfY'hfi `mmci f`ck b`k cf_"'I BGK \Ug`j Yfm'WYUf`[i]XY`]bYg`cb`k \Uhd`U[]Uf]ga `]g`UbX`\ck `hc`Uj c]X`]h''D`U[]Uf]ga `]g`i g]b[`h\Y`k cfXg`cf]XYUg`cZch\Yfg`UbX'dfYgYbh]b[`h\Ya`Ug`mci f`ck b"'D`U[]Uf]ga `]g`U`mdY`cZ]bhY``YWi U``h\YZh''=hWUb`hU_Y

- VfcUXVUbX'WcbbYWfjcb'f&) * '_V]h#gYWcf'ZJghYfŁ
- UV]`]hmhc`j`]Yk`ghfYUa`]b[`j`]XYc`fN][\`cf``ck`XYZ]b]h]cb`l_BGK``HJ`cdh]cbgŁ

A cfY`]bZcfa Uh]cb'UVci hgmghYa 'fYei]fYa Ybhg']g'Uj U]`UV`Y Uh<u>k k k "ghi XYbh'i bgk "YXi "Ui #a ccX`Y!gmghYa !fYei]fYa Ybhg</u>

5\WWgg]b['7cifgY'AUHYf]U`g'H\fci[\'AccX`Y

7 ci fgY ci h]bYgžgi ddcfha UhYf]U`gʻUfYʻi d`cUXYX`hc`A ccX`Yžh\Y`i b]j Yfg]hnighUbXUfX`@YUfb]b[A UbU[Ya YbhGmghYa `f@A GŁ"`±b`UXX]h]cbžcb!`]bY`Ugg][ba Ybhigi Va]gg]cbg`UfY`a UXY`i g]b[`h\Y Ugg][ba YbhXfcdVcI `ZJVJ`]hnidfcj]XYX`]b`A ccX`Y"`5```Ybfc``YX`ghi XYbhg`UfY`Ui hca Uh]WU``m`]bWi XYX`]b $\label{eq:linear} \begin{array}{l} K_{\rm c}^{\rm T}UW_{\rm b}ck_{\rm c}^{\rm T}X[Y^{\rm t}XY^{\rm t}GYXY[U^{\rm t}dYcd^{\rm T}Y^{\rm t}k_{\rm c}^{\rm t}UfY^{\rm t}XY^{\rm t}fUX]h]cbU^{\rm t}W_{\rm c}Dg^{\rm t}cZh_{\rm c}^{\rm T}UbXg^{\rm t}cb^{\rm t}k_{\rm c}^{\rm t}WX^{\rm t}BGK_{\rm c}^{\rm t}Ybg]b[hcb^{\rm t}Wa_{\rm d}i_{\rm g}^{\rm t}]g^{\rm t}cWW_{\rm c}^{\rm t}X''$

5ddYbX]I.'9b[]bYYfg'5ighfU`]U'f95E'DfcZYgg]cbU`'9b[]bYYf'7cadYhYbWm GHJbXUfX

Dfc[fUa`≢əhYbXYX`@YUfb]b[`CihWcaYg					

Dfo:Wogghdbufsyngnanunggynghdfatgegyngefa