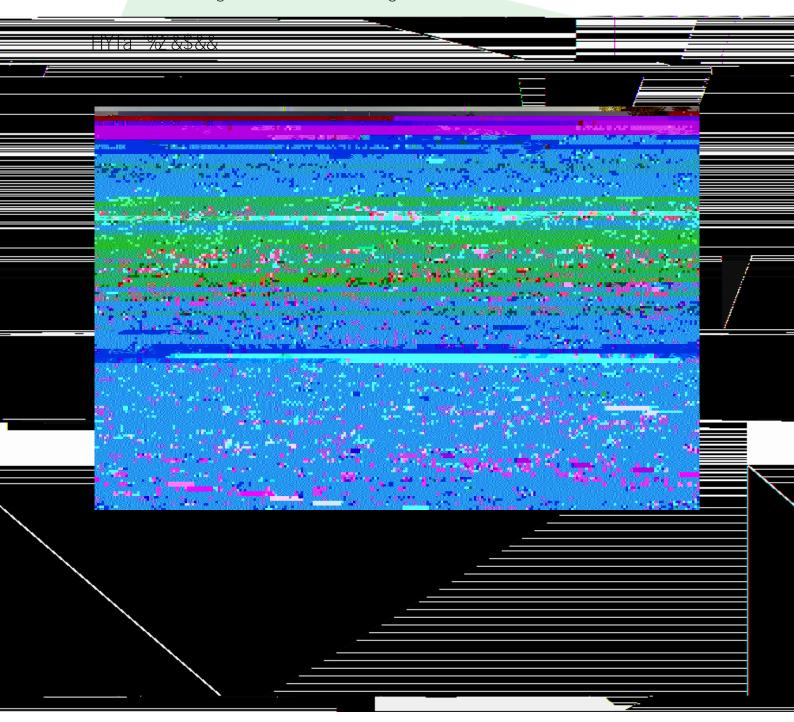


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: i bXUa YbHJ`gʻcZ; Yca YVXUb]Vg



7ci fgY Cj Yfj]Yk

GHJZZ7cbHJWh8YHJ]`g

7cbj Ybcfg

| B Ua Y | 9a U]` | 5j U]`UV]`]m | @cWJhjcb | D\cbY |
|----------------------|---------------------------------------|--------------------------------------|---|------------|
| 5fa Ub ?\cg\[\U`V | Ufa Ub" \cg\[\U`V4 i bgk "YXi " Ui | : f]XUmgʻZfca '' 'da hc'(.' \$'da | 79') \$' ž7]j]` 9b[]bYYf]b[6i]`X]b[| 9a U]`cb`m |

GWXcc`7cbHJWh =bZcfa Uh]cb

9b[]bYYf]b[*\DXi glf]U``HfU]b]b[-- *\DXi glf]U``lfU]b]b['ei Ygl]cbg'

LBGK Gh Xm5VfcUX - gh XmUVfcUX gh XYbhYbei]f]Yg flcf]bVci bX gh XYbhgŁ

I BGK '91 WXUb[Y'-ghi XYbhYl WXUb[Y'Ybei]f]Yg'flcf']bVci bX'ghi XYbhgŁ'

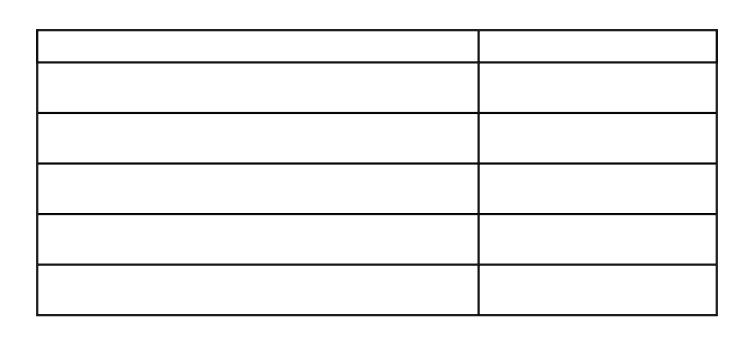
LBGK : i h fY Gh XYbhg - dch bh U`gh XYbh Ybei]f]Yg Y"["UXa]gg]cbgž ZYYgž dfc [fUa gž WfYX]h lfUbgZ f

D\cbY.

fŽ*%&Ł-',),)\$\$ - Bi WYi g Gh XYbh<i V

fŽ*%%&£'-',) '+**%'-'9b[]bYYf]b['=bXi ghf]U`'HfU]b]b['

fŽ*%%&L-',) " %+- '-1 BGK 'Gh Xm5VfcUX'UbX'I BGK '91 WXUb[Y'fZcf']bVci bX'gh XYbhgL'



5ggYgga Ybh

| 5ggYgga Ybh'tUg_ | K Y][\h | 8iY'8UhY | 7 ci fgY @YUfb]b[Ci HWca Yg 5ggYggYX |
|------------------|--------------|----------------------------------|--|
| %"·Cb`]bY'ei]n | %\$ I | A cbXUm'&, h\`: YV`Uh').') da | |
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5 hmy b X Ub WY F Yei] f Ya Yb hg

 $\hbox{Ghi XYbhg'UfY'ghfcb[`m'YbWc'i fU[YX'hc'UhhYbX'U```WUggYg'UbX'fYj]Yk'``YWhi fY'fYWc'fX]b[g''' } \\$

7ci fgY'GWXYXi `Y

J]Yk 'WUgg'ha YhUV'Y

H]a YtUV`Y

| 8UhY | Hmd Y | 7 cbhYbh |
|---|---------|----------|
| K YY_'%'%(': YVfi Ufm! % ': YVfi Ufm | @YWhifY | |
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FYgci fWyg

DfYgWf]VYX F Ygci fWYg

 $\label{thm:linear_control_bound} $$H\Y''H'I'' H'Cc_'ZCf''h'Y''Wc'' fgYZ'Cb''k \]WX'a cghcZh'Y''Wc'' fgY''Dck YfDc]bhg`]XYg''UfY''VUgYX''UbX''Wc'bHJ]bg$

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

D`YUgY`fYZYf`hc`h\Y`A ccX`Y`dU[Y`cZh\Y`Wci fgY`Zcf`Z fh\Yf`[i]XUbW\`cb`UggYgga Ybhigi Va]gg]cb"

I BGK `\Ug`U`ghUbXUfX``UhY`gi Va]gg]cb`dYbU`hmcZ

•)ı 'dYf'XUmž'Zcf'U``'UggYgga Ybhg'k \YfY'U'dYbU'hm'Udd`]Ygž'WUddYX'Uh'Zjj Y'XUmg'f1%&\$`\ci fg\z'UZhYf k\]WX'U'ghi XYbh\WUbbchgi Va]h'Ub'UggYgga Ybhž'UbX'bc'dYfa]hhYX'j Uf]Uh]cb"

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

6Yk UfY "5b" Ugg][ba Ybhh\Uh]bWi XYg"d`U[]Uf]gYX"a UhYf]U``k]```fYWY]j Y"U"\$ı ': U]`žUbX`ghi XYbhg`k \cd"\U[]Uf]gY\"a UmZU]``h\Y'Wci fgY"'Ghi XYbhg`k \cd"\U[]Uf]gY\"UfY\"U`gc"`]UV`Y'hc"X]gW]d`]bUfm'UWf]cbž]bWi X]b[YI Wi g]cb'Zfca 'Ybfc`a Ybh'

 $D`U[]Uf]ga ~]g'hY'i gY'cZUbch\Yf'dYfgcb'g'k cf_'cf']XYUg'Ug']Zh\Ymk YfY'mci f'ck b'''K ~Yb']h]g'bYWYggUfmcf XYg]fUV'Y'hc'i gY'ch\Yf'dYcd'Y'g'a UhYf]U`'mci 'g\ci `X'UXYei UhY`mUW_bck `YX[Y'k \cgY'k cfXg'cf']XYUg'h\Ym$

5 WUXYa]W = DZcfa Uhjcb

:]bU`'9l Ua]bUh]cbg.

:]bU``Yl Ua g`]b`H%`&\$&&`k]```VY`\Y`X'cb`]bY`VYlk YYb`&- h\`5df]`!`%kh\`A Um`]bWi g]j Yž`UbX`gi dd`Ya YblUfm Yl Ua g`VYlk YYb`&' fX'!`&+h\`A Um`]bWi g]j Y"`Mci `UfY`fYei]fYX`hc`VY`Uj U]`UV`Y`cb`h\YgY`XUhYg"`D`YUgY`Xcbchhc`a U_Y`UbmdYfgcbU``cf`lfUj Y``UffUb[Ya Ybhg`Xi f]b[`lh\]g`dYf]cX"`

57589A = 758J = 79

- ? YmiGtUZtc '7 cbtUWhZcf '5 WUXYa]W5 Xj]WY flc[']b 'k]th 'mci f 'n=8 'UbX dUggk cfXŁ '\thdg.#|btfUbYtiWl Yb["i bak "YXi "Ui # YmlqtUZtc!WcbtUWhXi flb[!mci f!ahi X]Yq!Uhi bak ''
- <u>? Ymil_BGK_'8 UhYg'</u>! 'Y["'7 Ybgi g'8 UhYžYI Ua 'XUhYgž``UghiXUmhc 'Xfcd'U'Wci fgY'k]h\ci h UWUXYa]\#Z|bUbW]U```]UV]`]miYhW''
- 7 J 9B 'Gh XYbh +bhfubYhflc[']b k]h 'mci f'n +8 'UbX dUggk cfXŁ '\hdg. #|bhfubYh'W| Yb["i bgk "YXi "Ui #gh XYbh]bhfubYh
- Gh XYbh@ZY 'Uh7 J 9B ž]bWi X]b['Gh XYbh GcW]Yh]Yg. \(\frac{1}{2}\) Htdg. #k k k "i bgk "YXi "Ui #Yb[]bYYf]b[#M]! UbX!Ybj]fcba YbHU!Yb[]bYYf]b[#gh XYbH]ZY \(\frac{1}{2}\)
- GdYV)JU``7 cbg]XYfUhjcb. \https://https://www.https://https://https://https://https://www.https://ht

5ddYbX]l. '9b[]bYYfg'5i glfU`]U'f95Ł'DfcZYgg]cbU`'9b[]bYYf'7ca dYhYbWm GHJbXUfX

| Dfc[fUa '±bHYbXYX'@YUfb]b['Ci HWca Yg | | | | |
|---|----------------|--|--|--|
| ?bck `YX[Y'UbX'g_]```VUgY | | | | |
| D9%%7cadfY\Ybg]j Yž'h\YcfmVUgYX'i bXYfgHJbX]b['cZh\Y'i bXYfd]bb]b['bUhi fU`'UbX d\mg]\W'`g\JYb\W'g'UbX'h\Y'Yb[]bYYf]b['Z bXUa YbHJ`g'Udd`]\WV`Y'hc'h\Y'Yb[]bYYf]b['X]g\Jd`]bY | | | | |
| D9%"&"7cbWYdhi U``i bXYfgHUbX]b['cZh\Y'a Uh\Ya Uh]Wgžbi a Yf]WU``UbU`mg]gžgHUh]gh]Wgž'UbX Wca di hYf'UbX']bZcfa Uh]cb'gW]YbWYg'k\]W\'i bXYfd]b'h\Y'Yb[]bYYf]b['X]gW]d`]bY | | | | |
| D9%" =:\\XYdh\`i bXYfgHUbX]b['cZgdYW]U`]ghVcX]Yg'cZ_bck 'YX[Y'k]h\]b'h\Y'Yb[]bYYf]b[X]gW]d`]bY | | | | |
| D9%"('8]gWYfba YbhcZ_bck 'YX[Y'XYj Y`cda YbhUbX'f]U`]ghVcX]Yg'cZ_bck 'YX[Y'k]h\]b'h | .Y'Yb[]bYYf]b[| | | |
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