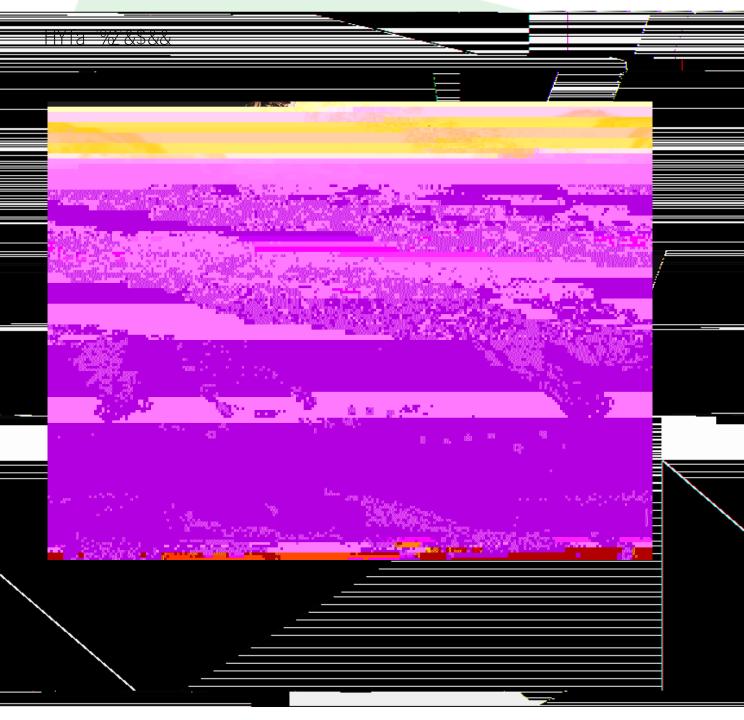
# **PTRL3025**

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PTRL3025 // Term 1, 2022 // published at 02-02-2022 © UNSW Sydney, 2022

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## 5 HYbXUbWY FYei ]fYa Ybhg

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#### 7 ci fgY GWX YXi `Y

#### J]Yk WUgg'ha YHJV'Y

#### H]a YHJV`Y'

8 UHY	Hmd Y	7cbhYbh
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K YY_`&.`&%: YVfi Ufm! &) ': YVfi Ufm	@YWhifY	BYh7Ug∖': `ck
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#### FYgci fWfg

#### DfYgWf]VYX F Ygci fWfg

7 ci fgY`bchYg`UbX`YI YfV]gYg`]b`A ccX`Y

#### FYWca a YbXYX<sup>-</sup>FYgci fWYg

7 ci fgY bch/g UbX YI Yf MgYg ]b A ccX Y

#### 7ci fgY'9j U`i Uh]cb'UbX'8Yj Y`cda Ybh

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### Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

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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[ 'Ub'UggYggUV'Y'UWfjj ]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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- | BGK "@YUfb]b[ "7YblfY"! "<u>k k k "`Wi bgk "YXi "Ui</u>
- 7 ci bgY``]b[ 'gi ddcfh! '<u>k k k "Wci bgY``]b[ "i bgk "YXi "Ui</u>

9ei ]HUV`Y`@YUfb]b[ 'GYfj ]Wfg

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

Mci f``YWi fYf`UbX`h\Y`I b]j Yfg]mik ]``YI dYWinci f`gi Va ]hYX`Ugg][ ba Ybhg`UfY`hfi `minci f`ck b`k cf\_"`I BGK \Ug`j YfmWYUf`[ 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`nci f`ck b"`D`U[ ]Uf]ga `]g`U`mdY`cZ]bhY``YWi U``h\YZh'`+i`WUb`hU\_Y a UbmZcfa gž`Zīca `XY`]VYfUhY`W\YUh]b[ `hc`UVW]XYbhU``mVcdm]b[ `Zīca `U`gci fWY`k ]h\ci hUW\_bck `YX[ Ya Ybh' H\Y`I b]j Yfg]mi\Ug`UXcdhYX`Ub`YXi WUh]j Y`UddfcUV\'hc`d`U[ ]Uf]ga `UbX`\Ug`XYj Y`cdYX`U`fUb[ Y`cZ fYgci fWYg`hc`gi ddcfhigh XYbhg''`5```h\Y`XYhU]`g`cb`d`U[ ]Uf]ga ž`]bWi X]b[ `gca Y`i gYZ ``fYgci fWYgž`WUb`VY Zci bX`Uhi<u>k k k "qh XYbh'i bgk "YXi "Ui #d`U[ ]Uf]ga</u> "

5```A]b]b[`'9b[]bYYf]b['gh XYbhg`UfY`fYei]fYX`hc`Wcad`YhY`U`gh XYbhXYWUfUh]cb`Zcf`UWUXYa]W]bhY[f]hm k \]WX`]g`ci h]bYX`]b`h\Y`Ugg][ baYbhWcj Yf`g\YYhg"`6mg][ b]b[``h\]g`XYWUfUh]cbž`mci``U[ fYY`h\Uhmci f`k cf\_`]g mci f`ck b`cf][]bU``k cf\_"

-Zmci 'bYYX'gca Y'UXX]h]cbU``gi ddcfhk]h\ 'mci f`k f]h]b[ 'g\_]`gž'd`YUgY'WcbhUWh\Y'@YUfb]b[ '7 YbhY'cf'j]Yk gca Y'cZh\Y'fYgci fW'g'cb'h\Y]f`k YVg]hY. <u>k k k "`Wi bgk "YXi "Ui</u>"'H\Y'@YUfb]b[ '7 YbhY']g'XYg][ bYX'hc`\Y`d mci ']a dfcj Y'mci f'UWUXYa ]Wk f]h]b[ 'UbX'Wca a i b]WUh]cb'g\_]``g"'Gca Y'gh XYbhg'i gY'h\Y'7 YbhY'gYfj ]WYg VYWUi gY'h\Ym'UfY'Z]bX]b[ 'h\Y]f'Ugg][ ba Ybhg'U'W\U``Yb[ Yž'ch\Yfg'VYWUi gY'h\Ymk Ubhhc']a dfcj Y'Ub'U'fYUXm gi WWYggZ ``UWUXYa ]WdYfZcfa UbWY"

## 5₩UXYa]W≢bZcfaUh]cb

# 7 ci fgY FYgi `hg

: cf<sup>·</sup>XYHJ]`gʻcbʻl BGK ʻUggYgga Ybhdc`]Whž'd`YUgYʻj ]g]h'<u>kkk"gh XYbHʻi bgk"YXi "Ui #JggYgga Ybh</u>

- VfcUXVUbX WcbbYWjcb f&) \* \_\_V]h#gYWcf ZJghYfŁ

K\_Y`UW\_bck\_`YX[Y`f\Y`6YXY[U``dYcd`Y`k\c`UfY`f\Y`ffUX]fjcbU``WigfcX]Ubg`cZf\Y``UbXg`cb`k\]W\`L\_BGK ?Ybg]b[hcb`WJa\_di\_g`]g``cWJfYX"

### 5ddYbX]I. '9b[]bYYfg'5ighfU`]U'f195EDfcZYgg]cbU`'9b[]bYYf'7cadYhYbWm GHJbXUfX

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?bck`YX[Y`UbX`g_]``VUgY	
D9%"%"7cadfY\Ybg]jYžh\YcfmVUgYX"ibXYfgHUbX]b["cZh\Y"ibXYfd]bb]b["bUhifU`"UbX d\mg]WU`"gW]YbWYg"UbX"h\Y"Yb[]bYYf]b["ZibXUaYbHU`g"Udd`]WUV`Y"hc"h\Y"Yb[]bYYf]b["X]gW]d`]bY	
D9%"&`7cbWYdhiU``ibXYfgHUbX]b[`cZh\Y`aUh\YaUh]VgjžbiaYf]WU``UbU`mg]gžgHUh]gh]VgjžUbX WcadihYf`UbX`]bZcfaUh]cb`gW]YbVW`g`k\]VX`ibXYfd]b`h\Y`Yb[]bYYf]b[`X]gW]d`]bY	
D9%" `=b!XYdh\`i bXYfgHUbX]b[`cZgdYW]U`]ghVcX]Yg`cZ`_bck`YX[Y`k]h\]b`h\Y`Yb[]bYYf]b[ X]gW]d`]bY	
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D9%)`?bck`YX[Y`cZYb[]bYYf]b[`XYg][b`dfUWf]WY`UbX`WcbHYIhiU``ZUWrcfg`]adUWf]b[`H\Y Yb[]bYYf]b[`X]gW]d`]bY	