

-RXUQDO RI (QJLQHHULQJ 6FLHQFH

9ROXPH ,VXXH SS

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7HFKQLFDO 6FLHQFHV

\$FDGHP\ RI 5RPDQLD & (QYLURQPHQWDO (QJLQHHULQJ DQG
ZZZ MHVL DVWU UR

5HFHLY\XJXVW \$FFHSWHSHPEHU
5HFHLYHG LQ UHRYVHPEHURP

1HZ LQVLJKWV IRU VHWWLQJ XS FRQWUD
IRU GHPDQG VLGH IOH[LELOLW\

*, \$1)5\$1&2 &+, &&\$1'5(\$ 0\$==\$

3ROLWHFQLFR GL 7RULQR 'LSDUWLPHQWR (QHUJLD 3
&RUVR 'XFD GHJOL \$EUX]]L 7RULQR ,WDO

\$EVWUWKEW SDSHU H[SORLWV WKH 'XUDWLRQ RI 8VH RI WK
FRQFHSW IRU GHDOLQJ ZLWK GHPDQG VLGH IOH[LELOLW\
WKDW ILQH JUDLQHG HQHUJ\ PHWHULQJ LV QRW XVHG DW
FRQVXPHUV L H WKH JUDQXODULW\ RI WKH HQHUJ\ P
PLQXWHV PLQXWHV RU RQH KR XU LV QRW VXIILFLHQW
GHPDQG SDWWHUQV HYHQW EDVHG HQHUJ\ PHWHULQJ
RSWLRQ WR SURYLGH D YHU\ GHWDLOHG UHFRQVWUXFW
SDUWLFXODU WKH XVH RI ('0 HQDEOHV KLJK TXDOLW\ WU
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RXWFRPHV D QHZ FODVV RI RSWLRQV IRU VHWWLQJ XS V
EDVHG RQ WKH GHPDQG GXUDWLRQ FXUYH LV HQYLVLRQH

,QWURGXFWRQ

7KH UHVWUXFWXULQJ RI WKH HOHFWULFLW\ EXVLQHVV Z
WUDQVPLVLRQ GLVWULEXWRQ DQG UHWDLO VHUULFHV
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*ULG FRGHV KDYH EHHQ HVWDEOLVKHG IRU WKH QHWZ
UDWHPDNLQJ 3%5 > @ KDV EHHQ DSSOLHG LQ GLIIHU
SHUIRUPDQFH EDVHG UHJXODWLRQ > @ LV WKH DOWHU
VHUULFH &R6 EDVHG UHJXODWLRQ 8QGHU 3%5 FRV
HIILFLHQF\ LQ WKH HQHUJ\ PDQDJPHQW PD\ OHDG WR
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&RUUHVSRRGHQFH DGGUHV JLDQIUHQFR FKLFFR#SROLWR LW
DQGUHD PD]]D#SROLWR LW

D UHOLDEOH DIIRUGDEOH DQG FOHDQ SRZHU DQG HQHUJ
UHGXFWRQV WKDW FRXOG DIIHFW WKH TXDOLW\ RI VHUY
DFWLRQ RI WKH UHJXODWRUV > @ \$FFRUGLQJ ZLWK > @
FRXOG 3GULYH LPSRUWDQW VRFLHWDO RXWFRPHV DV
RSSRUWXQLWLHV IRU LQQRYDWLYH XWLWLWLHV DQG WKH
XWLWLWLHV DUH ORRNLQJ IRU D FKDQJH WRZDUGV 3%5
WKH (OHFWULF 8WLWLW\ VXUYH\ > @ EDVHG RQ DQ RQOL
UHDGHUV LQ 'HFHPEHU RQO\ RI XWLWLW\ UHVSRQ
UHJXODWLRQ ZKLOH LQGLFDWHG SUHIHUHQFH IRU
WUDGLWLRQDO &R6 ZLWK 3%5 DQG DUH IDYRXUDEOH
3%5
,Q (XURSH LQ WKH ODVW WZR GHFDGHV WKH TXDOLW\ R
W\SHV RI OLPLWV GHILQH LQV WHUPV RI QRQ H[FHHG
TXDQWLWLHV IRU JLYHQ WLP SHULRGV UDWKHU WKDQ
TXDQWLWLHV \$Q H[DPSOH LV WKH TXDOLW\ RI VXSSO\ Z
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KDUPRQLF YROWDJH KDYH WR EH ORZHU RU HTXDO W
FRUUHVSRRGLQJ WDEOH LQ WKH 6WDQGDUG 7R DVVHV
PRQLWRULQJ LV QHHGHG (DFK TXDQWLW\ LV FDOFXODW
WKHQ WKH UHVXOWV DUH ILUVW DJJUHJDWHG RYHU YHU
FDOFXODWLRQ WKH (XFOLGHQ DYHUDJH RI WKH TXDQWL
\$ VXFFHVVLYH DJJUHJDWLRQ RYHU VKRUW WHUP LQWHUY
FDOFXODWLRQ WKH (XFOLGHQ DYHUDJH RI WKH TXDQWL
WHUP LQWHUYDOV)LQDOO\ DJJUHJDWLRQ RYHU ORQJ W
IURP WKH (XFOLGHQ DYHUDJH RI WKH TXDQWLW\ IRU V
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FRQFHSW RI 'XUDWLRQ RI 8VH ,Q WKLV ZD\ IOH[LELOLW
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7KLV SDSHU GLVFXVVHV WKH SRVVLELOLW\ RI HQKDQFLQJ
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SDWWHUQV ,Q SDUWLFXODU WKH XVH RI WKH QHZ HYH
PHDVXULQJ HQHUJ\ GHPDQG EHWZHHQ HYHQWV JHQHUDV
VKRZQ WR EH YHU\ SURPLVLQJ WR UHFRQVWUXFW GHPD
SUHFLVLQJ WKDQ LQ WKH WUDGLWLRQDO LQWHUYDO PHW
6SHFLILF DGYDQWDJHV UHODWHG WR WKH XVH RI ('0 DUH
WKH GHPDQG SHDNV DQG LQ WKH SRVVLEOH UHGXFWRQ
\$ IXUWKHU SRVLWLYH DVSHFW DULVLQJ IURP EHWWHU NC
WKH SRVVLELOLW\ WR HVWLPDWH WKH WHFKQLFDO ORV
HVSHFLDOO\ ZKHQ WKH GHPDQG KDV ODUJH YDULDWLRQV
WKH HOHFWULFLW\ GLVWULEXWLRQ

7KH QH[W VHFWRQV RI WKLV SDSHU DUH RUJDQLVHG DV
HYROXWLRQ RI WKH FRQFHSW UHIHUULQJ WR GHPDQG
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6HFWLRQ IRFXVHV RQ KRZ WKH ('0 RXWFRPHV SURYLGH
DVVHVVPHQW DQG FRQWDLQV D ZRUNHG H[DPSON WKDW
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'XUDWLRQ RI 8VH VFKHPH IRU HOHFWULFLW\ SULFLQJ LQ
FRQWDLQV WKH FRQFOXVLRQV

'HPDQG VLGH UHVSQVH DQG GHPDQG VLGH IOH[LELOLW

7KH HYROXWLRQ RI UXOHPDNLQJ KDV FRQVLGHUHG IRU P
'65 0RUH UHFHQWO\ WKH WHUPLQRORJ\ KDV EHHQ SDU
IOH[LELOLW\ '6) HYHQ WKRXJK VRPH RI WKH PDLQ F
UHJXODWRU\ GRFXPHQWV VWLOO UHIHU WR '65 +RZHYH
'65 7KH &RXQFLO RI (XURSHDQ (QUJ\ 5HJXODWRUV &
SDSHU > @ LQ)@LH[D W\HOL WKDW WKH FDSDFLW\ RI WKH HC

UHVSRQG WR FKDQJHV WKDW PD\ DIIHFW WKH EDODQFH R
7KH (XURSHDQ 6PDUW *ULGV 7DVN)RUFH ([SHUW *URXS
3WKH DELOLW\ RI D FXVWRPHU 3URVXPHU WR GHYLDW
FRQVXPSWLRQ SURGXFWLRQ SURILOH LQ UHVSRQVH
LQFHQWV' GHILQLWLRQV DUH FXVWRPL]HG IRU WKH H
JHQHUDO GHILQLWLRQ RI IOH[LELOLW\ ZDV DOUHDG\ JLYH
RI D V\ VWHP WR PDLQWDLQ IHDVLEOH RSHUDWLRQ RYH
FRQGLWLRQV > @
7KH FRQFHSW EDVH LHG WR WKH GHPDQG VLGH PD\ EH P
VDPH FRQFHSW VHHQ DW WKH JHQHUDWLRQ VLGH DQG
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SURYLVLRQ ZLWK D ZHOO GHILQH VKDSH 7KLV LV H[DF
VLGH WKH IOH[LELOLW\ RI WKH WUDGLWLRQDO JHQHUD
JHQHUDWRUV WR 3UDPS XS' RU 3UDPS GRZQ' WR UHDFK V
\$Q H[DPSOH RI QRUPDOL]HG IOH[LELOLW\ LQGH[UHIH
LQFRUSRUDWLRQ LQIRUPDWLRQ RQ UDPS UDWHV IRU VX
+RZHYHU GXH WR WKH IDFW WKDW WKH GHPDQG IOH[LE
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FRPSURPLVH LWV HIIHFWLYHQHVV > @)XUWKHUPRUH
FKDUDFWHULVWLFV DUH QHHGHG WR DOORZ EHWWHU GI
FRQILUPHG E\ > @PDUWVHQJHWKDWH3 D IXQGDPHQWDO H
IRU '6) KRZHYHU VRPH RI WKH FXUUHQW JHQHUDWLRQ
DGHTXDWH WR GHOLYHU DOO VHUYLEFHV UHTXLUHG IRU
(XURSH UHPDL'QVQDQ @VWXHV FRQFHSW LV UHLQIRUFHG
VXUYH\ FRQGXFWHG E\ &((5 DERXW WKH SRVVLELOLW\ RI
WKH QHWZRUN LQ WKH PRVW HIILFLHQW ZD\)URP WKHVH
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HIIHFWLYH PHDQV IRU DFKLHYLQJ IOH[LELOLW\ XVH DW G
H[SOLFLW UHFRPPHQGDWLRQ WR WKH (XURSHDQ 8QLRQ V
LQ ZKLFK VPDUW PHWHUV VKRXOG EH DEOH WR PHHW WK
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IRU WKH PHWHULQJ LQIUDVWUXFWXUH)XUWKHUPRUH
FKDUDFWHULVWLFV VXFK DV WKH PLQLXP VL]H RI W
JUDQXODULW\ VKRXOG EH LGHQWLILHG WR DOORZ WKH
SURYLVLRQ RI WKH QHHGHG VHUYLEFHV
7KH GHPDQG VKLIWLQJ LQWURGXFHG E\ '6) KDV DQ LPSDF

- 5HGXFWRQ RI WKH GHPDQG SHDNV ZLWK WKH EHQH UXQQQLQJ H[SHQVLYH ³SHDNLQJ' JHQHUDWRQ WR FRYHU KHOSV LQ UHGXFLLQJ JULG ORVVHV DQG FRQJHVWRQ LQ SRZHU IORZV
- 5HGXFWRQ RI WKH FXUWDLOPHQW RI LQWHUPLWWHQW SKRWRYROWDLF SODQWV
- 3RVWSRQLQJ LQYHVWPHQWV RQ QHZ QHWZRUN DVVHV GHPDQG L H ORFDO GHPDQG PLQXV ORFDO JHQHUDWL FKDUJH RU GLVFKDUJH RI ORFDO VWRUDJH XQLWV VHHQ WKH JULG
- ,QFUHDVLLQJ WKH V\VWHP HILFLHQF\ DOVR E\ PDNLQJ WKH HTXLSPHQW DW KLJKHU HILFLHQF\ DOVR OHDGLQJ V
- ,QFUHDVLLQJ UHOLDELOLW\ DYRLGLQJ WKH QHHG IRU L FRXOG EH XVHG UDUHO\ RU DYRLGLQJ ORDG VKHGGLQJ R ,Q DGGLWRQ '6) PD\ SURYLGH UHVHUYH FDSDFLW\ WR W WLPH VFDOHV DIWHU UHTXHVW WKXV UHGXFLLQJ WKH QH IURP WUDGLWRQDO JHQHUDWRQ 7KH WLPH VFDOHV D JHQHUDO HYHQ IDVWHU WKDQ WKH RQH UHIHUULQJ WR FI KLJKO\ YDOXDEOH 7KH SRVLWRQ SDSHU > @ FRQVLGH FRQVXPHUV DUH DEOH WR RIIHU WKHLU KRIQGLDOW\ LQ OHDVW KDYH WKH FKRLFH WR EH PHWHUHG DQG VHWWOH LPEDODQFH SHULRG LQ QDWRQDO PDUNHWV ZKHQ LW LV)ROORZLQJ WKH OLWHUDWXUH UHJDUGLQJ '65 WKH FRQV DFFRUGLQJ WR SULFH EDVHG RU LQFHQWLYH EDVHG VF GHILQLWRQV UHSRUWHG LQ WHFKQLFDO GRFXPHQWV W IURP SULFH EDVHG VLPSOLFLW NORZGLDOW\ ZKHUHDV WK WKURXJK LQFHQWLYH EDVHG VLPSOLFLW NORZGLDOW\ VELLOEWOHG :LWK LPSOLFLW IOH[LELOLW\ WKH IOH[LELOLW\ LV GHOL WKH FXVWRPHU WR WKH SULFH VLJQDO IRU WLPH RI XVH &33 SHDN WLPH UHEDWHV 375 RU UHDO WLPH SULFLC DGYDQFH H J HYHU\ \HDU ZLWK WLPH SHULRGV VXEM FKDQJH GXULQJ WKH \HDU H J VHDVRQDOO\ &33 LV D Y GHILQH DJDLQ LQ DGYDQFH LQ JHQHUDO DW OHDVW FULWLFDO HYHQW IRU VSHFLILF WLPH SHULRGV LQ ZKLF KLJK DQG WKXV FULWLFDO ,Q > @ LW LV LQGLFDWHG W &33 GRHV QRW UHIOHFW WKH DFWXDO FRQGLWRQV , UHGXFWRQV LQ WKHLU HOHFWULFLW\ ELOO GXULQJ SHD UHGXFH WKHLU FRQVXPSWRQ ZLWK UHVSHFW WR D JLYH RI WKH EDVHOLQH PD\ EH FULWLFDO EHFDXVH RI SRVV FRQVXPHUV VHH EHORZ 573 UHIHUV WR WKH RSHUDWR SULFH FKDQJHV GXULQJ WLPH ZLWK D VKRUW QRWLFH H \HDU +RZHYHU WKH GLIIXVLRQ RI 573 DV D G\QDPLF S OLPLWHG DW WKH PRPHQW DV YDULRXV FRQVXPHUV HQWHUSULVHV KDYH QR DFFHVV WR WKHVH WDULIIV > @

&RQYHUVHO\ ZLWK H[SOLFLW IOH[LELOLW\ WKH IOH[LELOLW\ LQFHQWLYH EDVHG SURJUDPPHV WKDW UHO\ XSRQ GLUH FXUWDLODEOH UDWHV HPHUJHQF\ GHPDQG UHVSQRVH VHUFLFH PDUNHWV 7KHVH SURJUDPPHV PD\ EH PDQDJHG HQWLW\ H J DQ DJJUHJDWRU 7KH LQFHQWLYH EDVHG LI LW SURYLGHV EHQHILWV WR WKH LQFHQWLYH PDQDJHU FSDFLW\ PDUNHWV RI EDODQFLQJ PDUNHWV ,Q WKH LP > @ FRPPHUFDO DQG LQGXVWULDO FRQVXPHUV DUH FR LQ LQFHQWLYH EDVHG '65 RQO\ WKURXJK DJJUHJDWRUV FRQVXPHUV LV QRW H[SHFWHG 7KHUH LV DQ RSHQ GHED IURP '6) DLPHG DW GHFUHDVLQJ WKH RSHUDWLRQ FRVW H[SHQVHV WR DFWLYDWH WKH PHDVXUHV WR SURYLGH IO VFKHPHV WKDW GHYLDWH IURP WKH FXUUHQW LQGXVWU\ 7KH VPDUW PHWHULQJ V\VWHP KDV WKH REMHFWLYH IXQFWLRQDOLWLHV DQG LQWHURSHUDELOLW\ DUH DYDL DYDLODELOLW\ RI QHZ JHQHUDWLRQV RI VPDUW PHWHUV ZLGHU UDQJH RI '6) RIIHUV IDFLOLWDWLQJ KLJKHU FRPS HQHUJ\ VHUFLFHV)RU VPDUW PHWHU GHSOR\PHQW WKH WKH HVWLPDWHG VDYLQJV LQ JHQHUDWLRQ DQG QHWZRU DQG DFWLYDWRQ > @ 7KH FRQVXPHU RU SURVXPHU PD\ GHFLGH WR GHOLYHU XQOHVV D FRQWUDFWXDO DUUDQJHPHQW KDV EHHQ HVWD IOH[LELOLW\ EHF\HHV DFWLRQ DWRUDQJHPHQW LV W\SLFDO EDVHG VFKHPHV ,Q > @ LW LV SRLQWHG RXW WKDW WKH SURYLGLQJ GLIIHUHQW VHUFLFHV DORXO GMDQGLQJ QFHG E WKH SRVVLELOLW\ RI RIIHULQJ GLIIHUHQW VHUFLFHV D SRVVLELOLW\ UHTXLUHV FOHDU GHWHUPLQDWLRQ DW WK WKH '6) SURYLGHG WR WKH GLIIHUHQW VHUFLFHV 2QH RI WKH PDLQ DVSHFWV WR EH FRQVLGHUHG IRU XQ GHPDQG VLGH RQ WKH V\VWHP DVVHO, KGMHUS SURSRQ DW HGH FDOFXODWLRQ LV IXQGDPHQWDO IRU HYDOXDWLQJ WKH L V\VWHP \$V VKRZQ LQ > @ WKH PHWKRGRORJLHV IRU G FDQ EH EDVHG RQ DSSURSULDWH LQXVWULQJ)RU H[D FDOFXODW\ DMBUDWHKQ DPRQJ WKH ; KLJKHVW HQHUJ\ XV WKH SULRU < RQ HYHQW GD\V WKLW PRGH LV LQGLFDW PRGHV DUH /RZ;RI< RU OLG;RI< RU ZLWK H[SRQHQLD UHJUHVVLRQ > @ \$QRWKHU SRVVLELOLW\ LV WKH XVH RI VLPLODU DV SRVLEOH WR WKH UHPDLQLQJ SRSXODWLRQ WKH SRSXODWLRQXVWULQJ WKH DGDSWDWLRQ RI DQ LQLWL WKH DFWXDO ORDG SDWWHUQ RFFXUULQJ EDYRUH VWDUW WR EH IROORZHG WR GHWHUPLQH WKH DGMXVWHG EDVH IDFWRU FDOFXODWHG DV WKH GLIIHUHQFH EHWZHHQ WKH EDVHOLQH IRU D FVDDLEWIDWL RQ RSKRQJ EHIRUH WKH HY ZLWK D PLQLXP DGMXVWPHQW RI]HUR DQG LV WKHQ

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SHULRG FDQQRW EH WRR HDUO\ LQIRWIGHUFRORXPHULV VV
WR DUWLILFLDOO\ FUHDWH IDYRXUDEOH FRQGLWLRQV LQ
OHDGLQJ WR HFRQRPLF DGYDQWDJHV LQ WKH GHWHUPLQ
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(YHQW GULYHQ HGHUJ\ PHWHULQJ

(YHQW GULYHQ HGHUJ\ PHWHULQJ ('0 DOVR FDOOHG HY
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VWHSV WULJJHUHG E\ WKH RFFXUUHQFH RI DQ HYHQW
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PHDVXUHPHQW JDWKHUHG DW UHJXODU WLPH VWHSV
7KH ('0 SULQFLSOHV KDYH EHHQ SUHVHQWHG LQ D QXP
DPRQJ ZKLFK > @> @ > @ 7KH PDLQ FGDUDFWHULVWLFV
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E DFFXPXODWHG HGHUJ\ YDULDWLRQ WKH YDULDWLRQV F
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YDULDWLRQ KDV EHHQ LQWURGXFHG LQ > @ WR HQFRPS
ZLWK UHVSHFW WR WKH WDUJHW PD\ RFFXU IURP SURJU

&KLFRR * HW 0D]JD \$ 1HZ LQVLJKWV IRU VHWLQJ XS

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WKH WKH ~~DUKROG~~ WKH PDMRU UHDVRQ RI VXFFHVV RI ('0
7KH WDUJHW LV PRGLLHG DIWHU WKH RFFXUUHQFH RI HI
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δ DQGDUH LPSRVHG LQ WKH ('0 DQG PD\ EH DGDSWHG G
GLIIHUHQW YLHZV RQ WKH GHPDQG SURFHVV
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GHWHFWHG DV DQ HYHQW &RQLVWHQF\ ZLWK ILVFD
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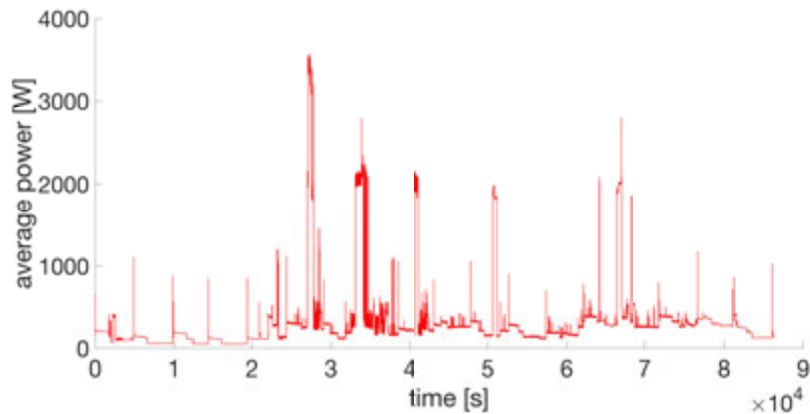
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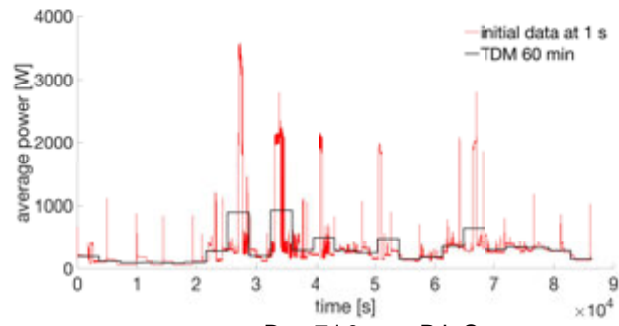
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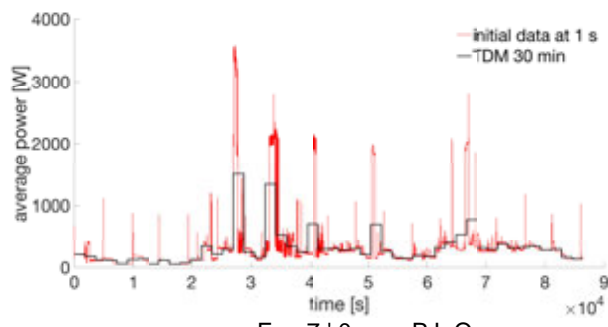
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7DEOH 2XWFRPHV RI GLIIHUHQW UHSUHVHQWDWLRQV IRU UHFRQ		5HSUHVHQWDWLRQ	RI	>:@ DQG SHU	UHVHVKROG	RI WKH ORVVHV
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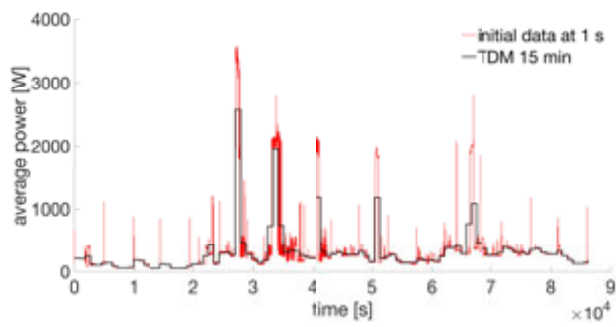
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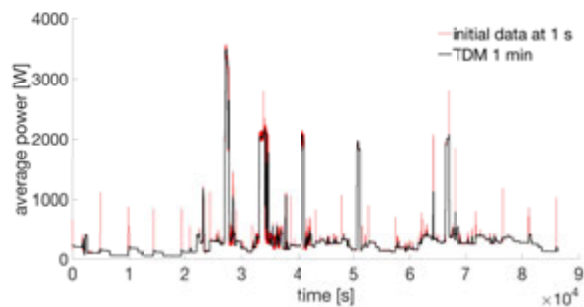
D 7'0 PLQ



E 7'0 PLQ

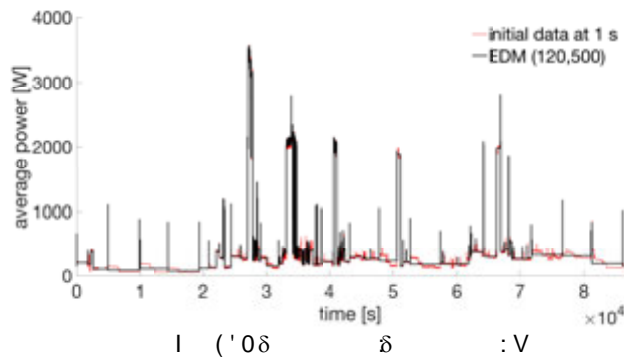
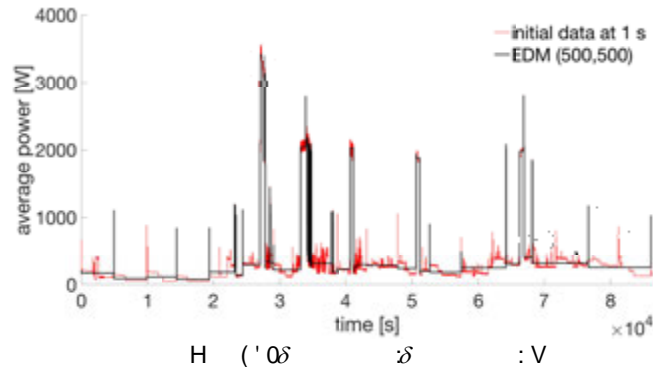


F 7'0 PLQ



G 7'0 PLQ

&KLFRR * HW 0D]]D \$ 1HZ LQVLJKWV IRU VHWLQJ XS



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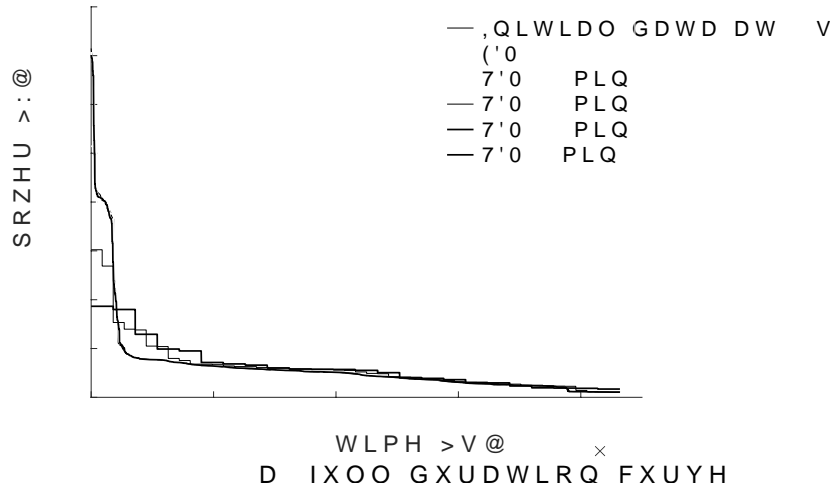
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V WLPH VWHS ,W DSSHUV WKDW WKH GDLO\ HQHUJ\
VDWLVIDFWRU\ ZD\ E\ XVLQJ WKH (DQG UHVXOWV ZLWK
LQ D UHVRQDEOH ZD\ E\ XVLQJ WKH ('0 UHVXOWV
:V DQG E\ XVLQJ WKH 7'0 UHVXOWV ZLWK PLQ WL
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H[SODLQ DQRWKHU VWURQJ SRLQW WR SURPRWH ('0 DV
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NH\ SRLQW IRU WKH GLVWULEXWLRQ V\VWHP RSHUDWRUV
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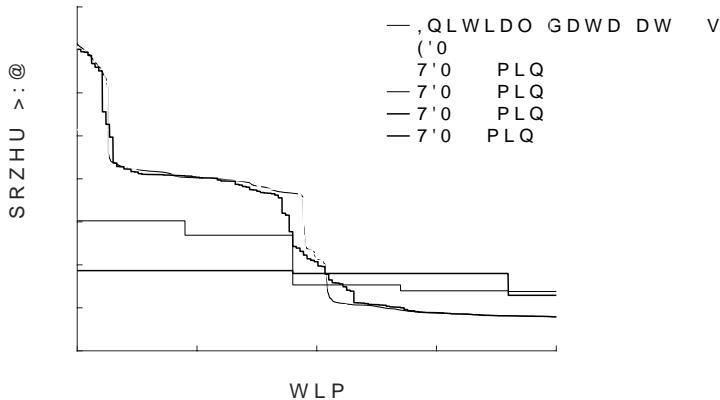
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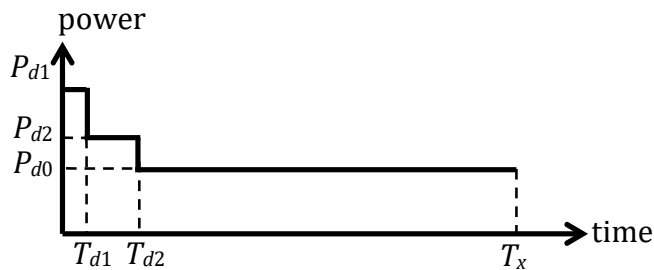
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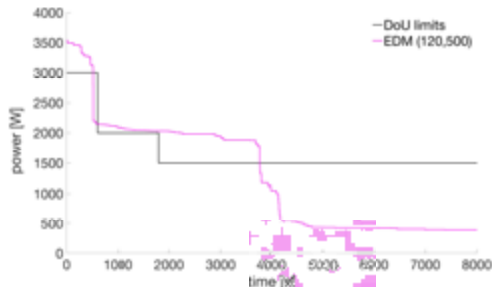
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&RQFOXVLRQV

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5HIHUFHV

> @ 0DUFVX : *3KHQFLFQFH %DVHG 5DWHPDNLQJ 7ULQFLSOHV DQG
(QHUJ\)RXQGDWLRQ 6DQ)UDQFLVFR
> @ &RPQH * \$ 6WRIW 6 3ULHQDQFH+%DGH-5DWHPDNLQJ IRU (8WLOLWLV 5HYLHZ RI 3ODQV DQG \$QDO\VLV SH\$RURP%F DQG 5HVR 8& 1RYHPEHU KWWSV HPS OEO JRY VLWHV GHDXOW >DFFHVHG 6HSWHPEHU @ > @ *RPH] 7 'LVWULEXWLRQ DQG SRZHU TXDOLW\ UHJXODWLRQ XQG FRPSDUDWLYH VWXG\ 3URF 1LQWK ,QWHUQDWLRQDO &RQIHUHFH F 2UODQGR)/ 2FWREHU > @ \$JDUZO 6 %XUZHVV5HJXODWRU\ PRGHV 0DUFK KWWSV DPHLFDVSRZHUSODQ FRP ZS FRQWHQW XSORDGV 1HZ5 6HSWHPEHU @ > @ 8WLOLW\ 'LYH DQG 3\$ &RQXOWLQJ *URXS 6WDWH RI V KWWSV V DPD]RQDZV FRP GLYHBDVVHV UOSV\ 6(8B B6XUYH\BILG 6HSWHPEHU @ > @ (XURSHDQ 6PDUW *ULGV 7DVN)RUFH ([SHUW *URXS 'HPDQG 6L DQG SURSRVHG UHFRPPHQGDWLRQV)LQDO 5HSRUW KWWSV HF HXURSD HX HQUJ\ VLWHV HQU ILOHV GRFXPHQVV HJ BIL SGI >DFFHVHG 6HSWHPEHU @ > @ 6LPRQRY 0 &KLF(FHQW =DQFHQW(QHUJ\ 0HWHULQJ 3ULQFLSOHV D ,((7UDQVDFWLRQV RQ ,QGXVWU\SSOLFDFWLRQV > @ /XR) .RQJ : 5DQ]SWLPBQJ+RRH (QHUJ\ 0DQDJHPHQW 6\VWHP ZL &KDUJH 7DULII DQG \$SSOLDQFH,2(SHULQVDFWLRQSHRQGHQDULHW *ULG L '2, 76* > @ &RXQFLO RI (XURSHDQ (QHUJ\ 5HJXODWRUV &((5 'LVWULEXWLRQ 8VH DW 'LVWULEXWLRQ /HYHO \$ &((5 &RQFOXVLRQV 3DSHU & KWWSV ZZZ FHHU HX GRFXPHQVV \$&(5 &((5 :KLWH 3DSHU (XURSHDQ (QHUJ\ 5HJXODWRUV :KLWH 3DSHU)DFLOLWDWLRQJ)OH[LEL G E I I H I >DFFHVHG 6HSWHPEHU @ > @ 6ZHDQH\ 5 (*SRVDFHQQRU RSHUDWLRQDO IOH[LELOLW\ LQ FKH 3DUW , IRUPXODVSRQ(DQG WKH\$U\ ± > @ *UXQHZDOG 3)OHNRQRYD 0G\QDPLVP DQG GLYHUVLW\ LQ HQ GHPDQG \$ FULWLFDO 5HYHBFK 6RFLDO 6FLHQFH > @ 0D - 6LOYD 9 %HOKRPPH 5(YDQVFKHQJ'DQG250BQQLQJ)OH[LE LQ 6XVWDLQDEOH,(RZHUQVDFWLRQV RQ 6XVWDLQDEGH (QHUJ\ > @ 3DUULVK % *URVQ 5GHF\$QRQVDFWLRQV DQG UHVSQVH OLYH XS V LQ PDQDJLQJ HOHF(QULFJLVHVHDFWFRV" 6RFLDO 6FLHQFH S ± > @ &RXQFLO RI (XURSHDQ (QHUJ\ 5HJXODWRUV &((5 \$GLFHV RQ (Q \$UUDQJHPHQVV KHOS GHOLYHU 'HPDQG 6LGH)OH[LELOLW\ 5HI & KWWSV ZZZ FHHU HX GRFXPHQVV DI E D I FGF IF

