



@DÄFü <+±- 1"0Ä" "E/\*U» È # 1 T>ñ N/- \*¼Ei  
 DpÁ \*U g 5 %- ' Y +±BW-0Ä" / g f FzE\*CW  
 %j Uüd=zk qüç ü=ñ Xê0Ä" RÖ"° EGDÈ 3 ,, ¥  
 Z -, % p2M%o g Ì } α#( Í ] mE6Ì } Kó' ±  
 ' \$+±- \*¼=g %Xê+±4g%æ A 0Ä" « ] +±/  
 \*¼=g £L' mE6Ì } +±- =g "A 0Ä" 6\* G U  
 £ ; +±E @DÄDô8 ZFú YÉ6 3üE6 +±Ì } "  
 Kz{ 3 0Ä" +±c ^ ELÓ% ' ([ B3K30Z ý ' • Ñ  
 f FzE\*CVW...o...k;U ] Uüd=zk qüç ü=ñ Xê0Ä"  
 'S 'Y @DÄFü g \$ ' = ' -E ÈK MÄ%g? à @DÄ  
 Xê+±@DÄ: o ÓK MÄ'ý ' 3 - È f E Xê0Ä  
 " " - • F C Xê%ç kü U= > • o...k;U ] Uüd=zk  
 qüç ü=ñ • Xêo R KxÖ "A 0Ä" EGDô • F C ü NE  
 mE6 +±8 Y D >Fü" - Ä0Ä" c ^ D° "s 9 #Kz  
 { 3 Fú ± 1ë Ó% - .ú 3 â Xê %o Wk =  
 • o...k;U ] Uüd=zk qüç ü=ñ w Xêo R KxÖ EGDô- NE  
 I 2CE6 G WÌ } "U@DÄ# : \*U- E€- \*¼T  
 i • K "£ Ì } E6 K K) ó FE/\*U » "xFü- Kbg K¼  
 g- Kb "A æ" ; a &cU@DÄELÓ 7 6 È ý t "s £ ...  
 UFú ± 1ë Ó " ) Ç T : P " - Ä £ Á \*U K) %  
 7E Xê0Ä" ZF\* ...U- Kdo E3K MÄ59- Kb  
 !oE3ö K¼m£4! Ó È Í Dy0Ä: o Ó T g È Í "Gi »  
 ' "Y ' -A/£ 3 ü i ¶ Z ' » 4~i +± • ii G, 4 Ç  
 z2(4 " - \*UD\$ / - Kb P • 3? J & mE6Ì }  
 - Kk! Ò!oE3" û 59 È (Y & G, 4 ELÇ z %A Ç  
 z æ" NÄU V \*U: 9 z 4, 4, % & » ML • 7 %æ  
 6 : 9 +±6 \*FüE - ' ! %æ3 ML • 4-4 Z +±G, 4  
 Ç z K MÄTIC g \$ +±- \*¼=g K MÄ&c; EGDô  
 EL • Ñ f FzE\*CWÄ ' ' ] @Ï 4 +±z 4) 1 6 \*Fü %EG  
 Dô i , , LO!@i"U: 9 ML • • , " : 94~i •  
 ÷, 4 W • : 9 +±ò â 8 +±] @Ï è Ó 1 @DÄu ( " "  
 4 È • ; " %D° » M4 +± Xê0Ä" " EL • Ñ f Fz  
 E\*CWÄ U: ÇE^, 4 Ç z 1ë Ó +±9 # "6\* LKz{  
 @DÄFü"ý P Dy0Äu ( %

x 1 "E WN , / g \$ Í N , %  
 t @ëM L • 1 , 4 z » z 4) x\_m W\_m =\_B 1  
 x\_k W\_k =\_B "£ Z M 1 K 3 X = • g ML • 1 , 4 +± •  
 Fü "t\_m 1 τ\_k 3 X = • g OY\_m WML • 1 OY\_k W, 4 +±  
 z 4) %f > \$ Í N , "OY\_m WML • +± • ii "x  
 Füi = • g g

$$z_m = \sum_{k=B}^K \textcircled{R} a_k f \%_m \tau_k o + \varepsilon_m = s_m + \varepsilon_m$$

$$m = \beta - "M \quad \%B o$$

< Z a\_k = • g OY\_k W, 4 +± p 1 Ì ( ' ε\_m = • g OY\_m  
 WML • +± "xFü — %f \%\_τ o g 6 \*Fü = ü \* • "A  
 = ü \* • N , i & " ' ([ β "Ò4 ' - 8

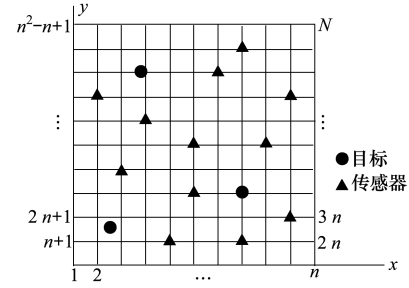
$$f \%_τ o = \begin{cases} \beta \text{œœœœœ}8 & d < d_1 \\ \beta & \\ \%o/d_1 \sigma & \text{œ} \text{£} \end{cases} \quad \%B o$$

< Z âl = Àτ - t Ä\_0 g, 4 ; Ò c ML • K! +±C .è +  
 d\_1 g i 50C .è + y g = • ü 2( • " " ^ (Ü ° à Ç " ¥ ,  
 i 80! g 0 ~ " x K! %

g 3 0- , Bæi "t @ëm 6, 4 +± p 1 Ì ( F\* \  
 - +±%, 4 \ û # \$ 6 — +± "xFü > Fü z = z\_B z\_0 "  
 - "z\_M Ò ] @Ï G W, 4 +± • , K 1 z 4) Γ =  
 x\_k W\_k =\_B %g 3 i » "Æ" 3 \$ Í N , = • g g  
 > Fü- Kb • <

$$z = s + \varepsilon \quad \%o o$$

< Z "s = s\_B "s\_0" - "s\_M Öε = ε\_B "ε\_0" - "ε\_M Ò %



+ Bœ 3i ML • 4-Ç z N ,

Öt K MÄü E ; 2(4 N ,

50;~ 3i ML • 4-4 >^3, +±1 4! • æ • g Z  
 +±G, 4 Ç z K MÄ%E È, 4 = ò 4 6 Ç L Ñ Ú \$  
 +± 3i \$ p 1 = ò 4) %g ^ F 4Y- Ç • Fü ML •  
 ' Ò c E È, 4 p 1 +± \$ "m 6, 4 \$ 3 G  
 Í U Ò c ML • 7 %g 3 ? à E - Ç z K MÄ" 3 ü  
 N • ii "xFü' Ng ' 7 m 6, 4 +± Ò c \$ g Ó

"^ » > i "x ^ 2 +±, 4 • Fü 6 K) "Ç z Ä + ÷ » ,  
 4VL - - \ - Ä "xFü • Fü T T ü > %g 3 È (Y  
 , 4VL - "3 • æ • g ? 3 = 0vK!C 4~i " - + β  
 m.g "E È 4~i Z +±%æ g 4~i %æ E È 4~i %æ  
 β] N 4C\$ "û 8 - 7 "OY β = y i %æ \$ g β "0- n "OY  
 n = y g n^0 - n + β "n^0 - n + 0" - "N 4~i %æ z 4) }  
 4 ^ x = x\_B "x\_0" - "x\_N Ò 1 y = y\_B "y\_0" - "y\_N Ò ' = •  
 • g +g = • g æ i "U θ\_i = %\_q "y\_i o" i = β - N = • g OY i

W4~i %æ 4 %AE Ê4~i %æ 4) ± = ± > FÜ Ø =  
 x<sub>i</sub> W<sub>i</sub> \ M±u - ± %  
 Ç v M 4! > FÜ  
 d %<sub>0</sub> o = f %<sub>0</sub> "θ<sub>i</sub> o" f %<sub>0</sub> "θ<sub>i</sub> o" - "f %<sub>0</sub> "θ<sub>i</sub> o" o Ò %<sub>0</sub>  
 %<sub>0</sub>g \*^0Yi Wi %æ = ± ± } "£ Z f %<sub>0</sub> "θ<sub>i</sub> o = • .g 0Y  
 m WML • û 0Yi Wi %æ , 48ä Ä ± ± • i i %  
 ' " • = ± ± - \*¼ , ¥ Æg  
 D %<sub>0</sub> o = d %<sub>0</sub> o "d %<sub>0</sub> o" - "d %<sub>0</sub> o Ò %<sub>0</sub>  
 œœM4 ± ± ' » i ± ± Ç z æ" t @ ð n 6 ± ± 41ë  
 -> 9j U' Ç4~i 7 "F"xFü FÜ = • .g g

$$z = \sum_{k=1}^K a_k d %_k o + \varepsilon =$$

$$\sum_{i=1}^N \text{œ} \text{R} w_i d %_k o + \varepsilon = D %_k o v + \varepsilon \quad \%_0$$

< Z " w = w<sub>B</sub> "w<sub>0</sub>" - "w<sub>N</sub> Ò = • .g EGD ò - \*¼ , ¥  
 D %<sub>0</sub> o Z ± ± x FÜ > FÜ z = ± ± = • .g 2 ( • % Ò É 0Yk  
 W, 49j U0Yi W4~i %æ "F ° ± ± p 2Mw<sub>i</sub> = a<sub>k</sub> + S  
 F w<sub>i</sub> = ! % ^ » , 4 ± ± • FÜ K E < » 4~i %æ ± • FÜ  
 N " = • .g 2 ( • w \ 1 • / - \*¼ ± ± % ' "A Ç z K MÄ =  
 g / - \*¼ \$ • : K MÄ % - -> Ç ³ / - \*¼ \$ " , 4  
 ± ± z 4 ^ U ; = • .g 2 ( • > FÜ Z L < L # p 2M & Ä ± ± 4~i  
 %æ %

# † ' » / - \*¼ = • .g Ç z

& » %<sub>0</sub> o Z ± ± K MÄ " z g L - \$ - FÜ " / - \*¼ ,  
 ¥ D %<sub>0</sub> o EGD %<sub>0</sub> o < ! o Ä "A K MÄ ± ± 3i T / - \*¼ E i  
 Dp ^ \ > @ « ] - W - / - \*¼ ? > FÜ w â t<sup>N</sup> 1ë -> E i  
 Dp z " - Ä w Z 6 - > ± ± < L # p 2MW • %A K MÄ  
 ! o ? • 4 g ! o ? - 8 • " K MÄ

z ) Dw %<sub>0</sub>

œœA K MÄ ± ± o ? Fô \*U 4 ó ± ± OMP æ" 6 D ° P ± ±  
 E i Dp ð ië Ó "s 4 ó OMP 0Ä" U ü NE Dð 8 Z L -  
 \$ F \* > @ • Ñ Ä ž ] m E 6 \ . Kó 7 "Ä ž Dð 8 g  
 w<sub>s</sub> â = U<sub>k</sub> ] = Ä z - D<sub>s</sub> w<sub>s</sub> Ä 0 %<sub>0</sub>  
 < Z "D<sub>s</sub> ; w<sub>s</sub> 3 X \ } „ ¥ ; & Á \ . Kó 7 ± ± 2 (   
 • > FÜ % ^ » „ \$ U ü ¶ € z Ì } ± ± B N [ x ;  
 ; m E 6 Ì } • Ñ " ' ; L • E Dð 8 Z : ° E 6 E  
 È Ì } %

U / - \*¼ FÜ ± K MÄ æ" Z "BW-1" / - \*¼ Dp i 0Ä"  
 £ @ ð Ä FÜ < " 6 E 7 œ ± FÜ ± u ( ' " 59 ] - "  
 " % 59 • Ñ f FzE\*CWÄ" \ BW-1" 0Ä" Z 6 E  
 7 œ ± - \*¼ \$ FÜ ± ± ± ¥ „ æ" " Y ' • Ñ f FzE\*

CWÄ" g ' YFÜ ± 0Ä" ' 1 = 3i ML • 4~4 Z,  
 4 ± ± Ç z % N Ä u ø 3ú • Ñ f FzE\*CWÄ" %  
 # Ö † • Ñ f FzE\*CWÄ"  
 f FzE\*CWÄ" \ - .ú E 4 E Dð 8 "ü NE  
 Z G U Ì } „ ¥ D Z ( « ; „ \$ , % T - T  
 ± ± Ì } % K ¼ m 3 ? 1 E # ' " „ \$ 6 \* FÜ E # =  
 K z { " i W 3 ? Dð 8 6 \* FÜ m • % 8 3 ? Fô \* U ± ± Ì }  
 „ ¥ \ Dô 1 4 ± ± " U : K ) c 3 ? E N • ò â 8 " 3  
 ? Ä ] ± ± Ì } 6 \* FÜ x 1 ( < 1ë Ó E i Dp Ì ø  
 \$ %

ž ú f FzE\*CWÄ" c ^ EL Ó ± ± 0 W FÜ ± @ 2M  
 Dô f Fz ( Y Ä Ž 1 L < • Ñ Ä ž % E 0 W 2M ± ± ( Y •  
 » Dô 1 4 „ ¥ ± ± Ä † T 1 f FzE\*CWÄ" ± ± B W - T %  
 f FzE\*CWÄ" ± ± - W ; k ' i %æ ü NE t E 6 Ì  
 } „ ¥ Z ; „ \$ - f Fz ± ± Ì } ' E i Dp ,  
 \$ " E .ú æ" E \* ! o ü NE ; ± ± „ \$ 6 \* FÜ 8 K z  
 - T % t @ è 3ü Ä ] - 3ñ f Fz Ì } " & „ \$ 4  
 4 \* U A æ" E = y f Fz 3 G Ä ] 1 Y „ \$ - f Fz  
 ± ± Ì } % f FzE\*CWÄ" ü NE Dð 8 Z Ä ] Y ± ± Ì  
 } 1 Ì \ . Kó m M = ± ± \$ K ! £ : • Ñ " 59 G B '  
 Ä † 3 FÜ " U K ¼ ± ± E \* C W = ' - E È B ' ± ± 3  
 FÜ L -> @ B ' ! G ± ± Ì } 59 È Í @ ð Ä : o Ó % • Ñ f  
 FzE\*CWÄ" EGD ô • 3ü f Fz Ä ] ± ± Ì } - Ä \ ¼  
 Kó Z Ì } • = - 3ñ • Ñ " ' 8 N Ä ] ± ± Ì } < » A  
 • Ñ ' M = / \$ K ! ± ± ' / \$ K ! % • Ñ f FzE\*CWÄ" x :  
 3 ' Y f FzE\*CWÄ" ± ± < • Ñ Ä ž 1 Dô f Fz ( Y Ä Ž %

0Ä"	Bœ 4 ó • Ñ f FzE*CW
DÄ'	â z "K "D
DÄ'	â w
	J ø C œ = "k = ! "w = "r <sub>1</sub> = z
	€ k < K & ] U <sub>1</sub> r <sub>k</sub> o > C E ' x (Ü
	œœ % <sub>0</sub> "i o. ] U <sub>1</sub> r <sub>k</sub> o
	œœ . s N t
	œœ w <sub>s</sub> . U <sub>k</sub> ] = Ä z - D <sub>s</sub> w <sub>s</sub> Ä
	œœ k + B • z - D <sub>s</sub> w <sub>s</sub>
	œœ k = k + B
	x (Ü 0 E
	w <sub>s</sub> . w <sub>s</sub>

U f FzE\*CWÄ" E Dð 8 Z "ü NE 6 ± ± -  
 f Fz Ì } s<sub>k</sub> ; z L • 3ü f Fz ] ± ± Ì } ± ± ± ± \ ¼  
 Kóp 2M<sub>k</sub> W<sub>ij k j k</sub> £ : - Ç \$ B à • Ñ 2 ( % • Ñ f

FzE\*CWÄ" ZEGðfô\*U HøJ Kùd] ⇒ w• Ñ CDô8 " V\*U Ä ] +±ì } &E Ä ] +±Ýì } • Ñ C %4 ó • Ñ f Fz0Ä" - 0Ä" ßm.g %

#Z† EL• Ñ f FzE\*CW U 4 ó +± Xê0Ä" È(Ý Z " ü NE #L->@o ? - < 1 ..K MÄ%o%oA < EGDô@DÄDs +± X••ç Kê çø WE3D<sup>†</sup>"EGDôw<sub>s</sub> = D<sub>s</sub><sup>†</sup>z !o Ä %o o < +± ? % UOYk NE # " @DÄWE3D<sup>†</sup> #L->@&k × k Kc - KdoE3% p(Ý "K¼m- Kb4! • k È í "lo? W E3+±@DÄ: o Ó È í " @DÄ: o Ó Dë] O %o o%

g<sup>3</sup> Kz{ @DÄ: o Ó "ý ' ³ & mE6} ,, ¥ E =y D\$ / P• } 3? %ai Kq, ßo%@ë, ¥ D Z m E6+±k Wì } +± P• } 3? g

$$D_k = \Psi_k R_k \quad \%oO$$

ææ} ,, ¥ D<sub>k</sub> D • Ñ " £ A R<sub>k</sub> \ U £ h &>ÿ3ì 7 □ 6 • &>ÿ3ì p2M±7 6>ÿ- Kb%@äUOYk NE Z "D<sub>k</sub> +±D \ Fô\*UE N • E =y ç ¼" d<sub>i</sub> %ßj i j k o \ OYi WE6 +±ì } %3 %o o < ' %o o < Ä w<sub>k</sub> â = Uk] =<sub>w<sub>k</sub></sub> Äz - Ψ<sub>k</sub> R<sub>k</sub> w<sub>k</sub> Ä<sub>0</sub><sup>o</sup> %ß! o ææ\*^ » D<sub>k</sub><sup>1</sup> Ψ<sub>k</sub> D/§ K!Ov \$ " c<sub>k</sub> = R<sub>k</sub> w<sub>k</sub> " F 7 < g

$$\hat{c}_k \hat{a} = Uk] =<sub>w<sub>k</sub></sub> Äz - \Psi_k c_k \hat{A}_0^o \quad \%ßo$$

\*^ P• 3? - " Ψ<sub>k</sub> g • Ñ- Kb" F 6

$$\hat{c}_k = \Psi_k^{-\beta} z = \Psi_k z \quad \%ßOo$$

û59E-z ³ - Kb+±!o E3K MÄ" ñ Ä ELlo Ä ê<sub>k</sub> %Ä ] ê<sub>k</sub> ; "EGDôw<sub>k</sub> = R<sub>k</sub><sup>-β</sup> ê<sub>k</sub> « ] - E? %

j oí - ' "U0Ä" ! Ý Ψ<sub>k</sub> "R<sub>k</sub> ; R<sub>k</sub><sup>-β</sup> Dô8 Z "K¼ ,mE N • k +±È í "lo R<sub>k</sub><sup>-β</sup> +±@DÄ \$ G k 9, È í " ' { : o Ó Xê0Ä" +± J[ U » - , P u ] ! Ý Ψ<sub>k</sub> "R<sub>k</sub> ; R<sub>k</sub><sup>-β</sup> %

NÄu V\*U HøJ Kùd] ⇒ w• Ñ CDô8 ' ! Ý Ψ<sub>k</sub> %\*^ » D<sub>k+ß</sub> +±z k D □ 6 P• 3? Ψ<sub>k</sub> R<sub>k</sub> " L->@EGDô HøJ Kùd] ⇒ Dô8 ' ( « Ψ<sub>k+ß</sub> +±- ; - D %o UE .ú ò â 8 "6

$$\Psi_{k+\beta} = \Psi_k \Psi_{k+\beta} \hat{O} \quad \%ß o$$

< Z " Ψ<sub>k+ß</sub> =  $\frac{q_{k+\beta}}{\hat{A}q_{k+\beta} \hat{A}_0}$  "q<sub>k+ß</sub> = %o - Ψ<sub>k</sub> Ψ<sub>k</sub> α<sub>k+ß</sub> % Ψ<sub>k</sub> Ψ<sub>k</sub> DyoÄ3 ì } d<sub>k+ß</sub> Ä ž ] Ψ<sub>k</sub> M = +±§ K! " %o - Ψ<sub>k</sub> Ψ<sub>k</sub> oDyoÄÄ ] d<sub>k+ß</sub> U Ψ<sub>k</sub> M = /§ K! +± • Ñ = /§ K! 7 +± 3 Fü% EGDôE d +± • Ñ 4 ó C ì ! Ý Ψ<sub>k+ß</sub> % - \*U9 d +± æ" EGDôR<sub>k</sub> ' ! Ý R<sub>k+ß</sub> " ! Ý TM< - 8

$$R_{k+\beta} = \begin{bmatrix} R_k & v \\ & \mu \end{bmatrix} \quad \%ßxo$$

< Z " v = Ψ<sub>k</sub> d<sub>k+ß</sub> " μ = Äq<sub>k+ß</sub> Ä<sub>0</sub> % \*U9 d +± æ" @DÄÄ ] R<sub>k</sub><sup>-β</sup> ; " \*U- Kb3 ,, loE3 Ä ] R<sub>k+ß</sub><sup>-β</sup> ! Ý TM< - 8

$$R_{k+\beta}^{-\beta} = \begin{bmatrix} R_k^{-\beta} & -\frac{R_k^{-\beta} v}{\mu} \\ & \frac{\beta}{\mu} \end{bmatrix} \quad \%ß" o$$

ææ& » Z ] T +± • › 4! Ó k i " ' æ" È(Ý +± Xê0Ä" ! 4 ó WE3È(Ý! %" < ] A æ" U ZK!E Dô8 Z : L->@@DÄw<sub>k</sub> " L->@U ü NE # @DÄc<sub>k</sub> £ U - ; OYk NE x ; « ] w % w = R<sub>k</sub><sup>-β</sup> c<sub>k</sub> " £ Z c<sub>k</sub> g c UOYk NE +±i % CA 0Ä" UE Dô8 Z œ L-@DÄR<sub>k</sub> " L- & Ψ<sub>k</sub> ; R<sub>k</sub><sup>-β</sup> E =y ! Ý %

0Ä" 0æ ' » P• 3? +± EL• Ñ f FzC CWÄ"

DÄ' äz "K "D

DÄ' äw

$$J \emptyset C \text{æs} = \quad "k = ! "r_1 = z " \Psi_1 = \quad \hat{O}R = \quad \hat{O}$$

$$p_1 = x < r_1 "d_n > W_{n=\beta^0 \cdot -n}$$

$$\in k < K \text{æE} ' x(\hat{U})$$

$$n = Uk] U^{\%o} p_k | o +$$

$$s . s N n +$$

$$q_{k+\beta} = \%o - \Psi_k \Psi_k \alpha_{k+\beta}$$

$$\Psi_{k+\beta} = \Psi_k "q_{k+\beta} / \hat{A}q_{k+\beta} \hat{A}_0 \hat{O}$$

$$v = \Psi_k d_{k+\beta}$$

$$f \rangle \text{æ}8 \%ß" o ! \hat{Y} R^{-\beta}$$

$$p_{k+\beta} = p_k - < z "q_{k+\beta} > \frac{1}{4} < q_{k+\beta} "d_i >$$

$$k = k + \beta$$

$$x(\hat{U}4 \text{œ}$$

$$c_K = \Psi_k z$$

$$w = R_K^{-\beta} c_K$$

' » 4~i C Ç z 2(4 Z", 4 6\* z » g<sup>2</sup> ( < z 4>59: U4~i Z ô %E .ú ò â 8 "Fú± \$ w ^ : \ - W ß- \*¼ \$ "gDpi /- \*¼ \$ "...U > • +± < L#p 2M%g<sup>3</sup> ý P Ç z 1ê Ö "6 ò >@& w Z E ÈL<L#p 2MmX, 4 œE =y 1)3 %EGE \ Fô\*U BUô0Ä" @äUOYk W, 4 Kçp6 J Wi %æ Á +±i w<sub>k</sub> %o T » ý - WK K] λ "3 E È%æñ =K65 =•.g g

$s_k = x_i | w_k \%o > \lambda W \quad \%B o$   
 < Z " i ; i %æ 4 %q "y\_i o & Á "FOYk W, 4 +±z  
 4> ] @îi EÐð@ÐÄKó5 s\_k +±BUð ' ] @Î

$\%q "y_k o = \grave{u} \grave{u} \psi \Rightarrow \%q "y_i o" i \hat{a} s_k \quad \%B O$   
 < Z " ù \grave{u} \psi \Rightarrow =.g @ÐÄ%æ±BUð %  
 #Ž±Dý0Ä: o Ó 3 ½

4 ó Xê0Ä" +±U Ì } E6 ' Oñ@ÐÄ: o Ó  
 g O MN o"UE6 ] - WÝ+±ì } ; @ÐÄ, Dð  
 /8 Z "...U- Kðo E3Dý0Ä%0Yk NE # ^ G...U  
 & k × k Kc Kðo E3" £ @ÐÄ: o Ó7 > g O %o o"  
 !o , +±@ÐÄ: o Ó g O MN k + Mk<sup>0</sup> + k o% ' "  
 U \* \* ¶ - È { : o ÓDý0Ä; "ü NE h+±@ÐÄ

: o Ó g O MN + Mk + Mk<sup>0</sup> + k o%3üDðK NE  
 ; " 4 ó • Ñ f FzE\*CW0Ä" h @Î0ÄFü3Ó g

$\left( MN + \frac{M}{0} \right) K + \left( \frac{M}{0} + \beta \right) K^0 + -K + \frac{\beta}{x} K^x \%$   
 ' » P• 3? +± Xê0Ä" ; 4 ó Xê 6 k  
 9, : 9+±@ÐÄ: o T %0Ä" Z ü NE Z!o - T,%  
 Ì } @ÐÄ: o Ó; 4 ó Xê,%9 " O MN o+U  
 ! Y R<sub>k+ß</sub> # @ÐÄ: o Ó g O MN k o+U! Y ψ<sub>k+ß</sub> ;  
 q<sub>k+ß</sub> # @ÐÄ: o Ó O MN + Mk<sup>0</sup> o%K NE ; \* \* \*  
 ¶ - È { : o M! ; "h+±@ÐÄFü3Ó g MN + M α +  
 K<sup>0</sup> +  $\frac{\beta}{x} K$  %

' » P• 3? Xê0Ä" UE Dð8 ZE~z 3  
 ,! Ò &- Kðo E3" - Ä0Ä" +±Dý0ÄFüT gKz{ %

ú† , ,L 3 ½

Y7 Z "O'@î• Ñ f FzE\*CW' » - Kðo E3B)3  
 Xê<sup>ß0</sup>"y' +±' » P• 3? +± EL Xê æ" Fz  
 5BUð0Ä" U ML • 4~4 +±, 4 Ç z T6\* 1 @ÐÄ  
 u( ' %

,L Z "8 Í 6" XA! ; # , ,L Ž # t g âML  
 • >³, 80! g - Wg %g ß! ] ! ß! ] +±1 4! Ç  
 z g " , 4+±•ii Í ^ g ² K¼g 3 0+±M W  
 ML • ' FðKó+ \*¼•g 0Ä" Z+±4~i g t - ?  
 3 g ß! ] ß! +±4~i %

g³ : ^ - 7YT "ML • Ò c \$+±C ± O5D  
 N, +±i • @ð g âm6 , 4 p 1 Ì ( ' t g a₁ =  
 ß! ] ü "i 50C .è g d₁ = ß ] "=• ü2( • γ = 0" £E6  
 δ = ß<sup>-</sup> %ogE +±3ð • Ž # %GW, 4+±Ç z  
 T6\*\*^ t A %oo ú M"Ç v ~ 8

$$e = \frac{\beta}{K} \left( \frac{\beta}{K} \right)^K \sqrt{\%q_o - \hat{x}_k o^0 + \%q_o - \hat{y}_k o^0} \quad \%B o$$

< Z " %q "y\_k o ; %q "y\_k o 3 X =•OYk W, 4+±Ë  
 Kr} 4 1 ] @Î} 4 %g ³ 3 ] @Îz 4> 3 Fz4 , 4 "  
 NÄu @ÐÄ] @Î' ËKr z 4> +±m6 6\* &+± t A  
 " &c ; E6 t A - <+±- W%og f Fz4 É %  
 m6 , ,L+±4 ÉFð\*U ß!!! N( /ð+±9Æ Ž4,, ÈO'  
 8ä Ä L•+±4 É %

U ËKr Ç z K MÄ->50;~"x FÜ— "ML • Ò  
 c \$+± — Ç v g âü WML • +±"x FÜZ ê Í  
 - WÍ TP Ü — N %b "σ<sup>0</sup> o% — ! %i, q o Ç v  
 - 8

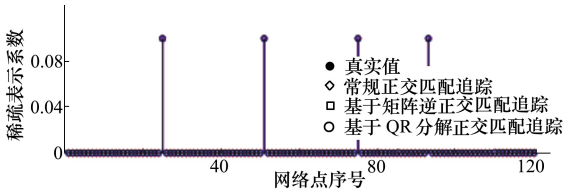
$$R_{i,q} = \beta \left( \frac{\hat{A}t \hat{A}^0}{M\sigma^0} \right) \quad \%B o$$

< Z " t =•.g M WML • +±•ii "x FÜi %  
 úŽ± —ò â 8 Ç z T6\* &!

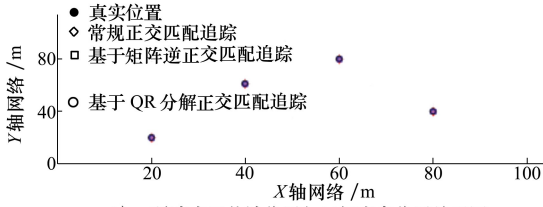
NÄu 50;~³ - W)3 +±Ç z g æ" \* \* \* ML •  
 z 4> : - Ç T 1 "x FÜ— +±ž ú %x W, 4 1 • 9j  
 U ? 3 a +±4~i 7 %E È, 4+±, L È z 4> 3 X g  
 %! "O! o%"! " !o%"! " !o! %!"! "x! o%-~\*U : 9  
 0Ä" EÐð ! WML • ' Ç z x W#½%£ Z ML •  
 K¼g 3 0 U ß! ] ! ß! ] +±1 4! Ç z g ² %

+ 04 ' ³ U —ò â 8 "e>ñ• Ñ f FzE\*CW  
 æ" & » - KðE3Ç)3+±• Ñ f FzE\*CWæ" ÷ '  
 » P• 3? +±• Ñ f FzE\*CWæ" U —ò â 8+±•  
 .g2( • ÷ z 4> ] @ð É %+ 0LbZ4 ' ³ /- \*¼•  
 .g2( • ; i %æ \$ x K!+± 2( %^0Y ß7 Z/- \*¼•  
 .g N, - "€OYk W, 4 9j UOYi W4~i %æ # "F  
 =•.g w\_i = a\_k = a\_1" , ,L # @æÇ Ì ( ' g ß! ] ü =  
 ! ßü " ' , 4 m U4~i +±•.g2( • g ! Ž"Í 6  
 , 4+±i %æ Á+±•.g2( • g !%, ,L # i %æ! C  
 @æÇ g ß! ] "U ß! ] ! ß! ] g 3 = ß! Wi  
 } "i %æ ^ g ßß! ßßg ßOß W%+ 0&oZ4 ' ³  
 ,L È z 4> ; , ,L z 4> 2( + %û + Z ,8 ' "U  
 —ò â 8 ' » P• 3? +± EL Xê ; £ Xê  
 0Ä" 6,%9+±•.g2( • ; Ç z 1ê Ö "L<L#•.g2( •  
 W• ; , 4 W•,%9 " &, 4 \$ Fú± T6\* OÈ D°  
 )3 %

úŽ± ML • W• & » Ç z T6\* 1 @ÐÄu( +±ž ú  
 UY , ,LA O'Z "4~i T < g " ] , 4 W• g  
 x", 4 K¼g 3 0 " - 3ð ] @Fð\*UBUð 0Ä" E =y è |  
 1)3 %+ 4 ' ³ , 4 • , "4~i T < - Ç ò â  
 8 "ML • W• ; ] @Îê Ó+± 2( "+ x4 ' ³ ML



a) 稀疏表示系数与网络点序号(位置指标)之间的关系



b) 稀疏表示估计位置与目标真实位置关系图

+ 0æ)3 ò â 8 : 9 Xê0Ä" T6\* &!

• W• ; @ÐÄËLÓ±± 2( %

+ =; " » P• 3? ±± Xê0Ä" ; £ 0

.ú Xê0Ä" ,% Ç z 1ëÓ : ,% 7 8 "U, 4 W• :

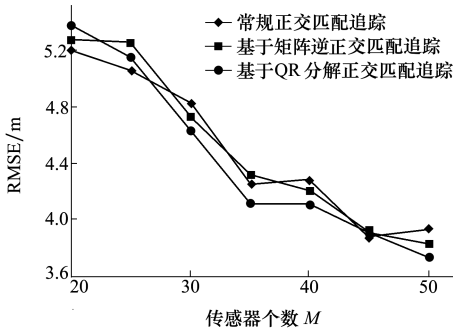
±±ò â 8 " .ú æ" Ç z 1ëÓF\*K¼ML • • FÛ±±

Ë Í 59Ç z A < %\*^ + x - "U@ÐÄT6\* æ

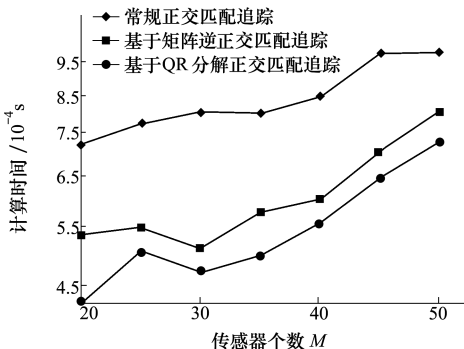
L• "K¼m ML • • , ±±Ë Í @ÐÄ#K!B• ' B•J- "£ Z

e>ñ Xê0Ä" - 5D# " ' » - Kb!o E3B)3 Xê0Ä

" N x "Ö8}±±0Ä" T6\* - E %

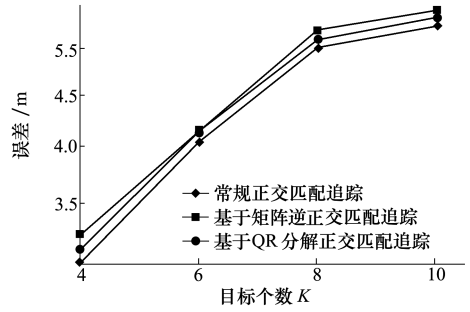


+ æML • W• ; ] @ËëÓ±± 2(

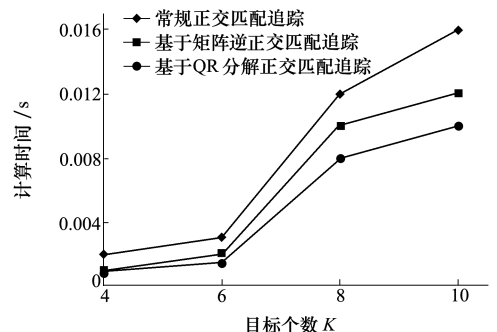


+ xæML • W• ; @ÐÄ#K!±± 2(

úŽ±, 4 W• & » Ç z T6\* 1 @ÐÄu( ' ±±ž ú  
 A , ,L Z "ML • W• g 0" "4~i T < g " ]"  
 , 4 W• g û xW C 0W, 4 g ' E ] B! W  
 , 4 % + " 4 ' 3 ML • W• "4~i T < - Ç ò â  
 8 " , 4 • , ; ] @ËëÓ±± 2( " + 4 ' 3 , 4 •  
 , ; @ÐÄ#K!±± 2( %



+ "æ 4 • , ; ] @ËëÓ±± 2(

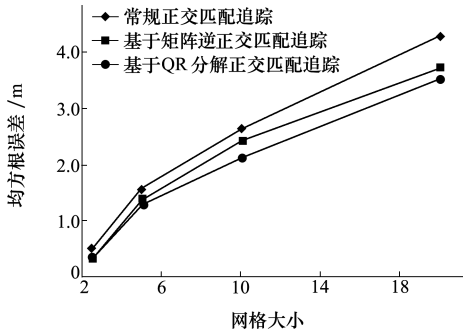


+ æ 4 • , ; @ÐÄ#K!±± 2(

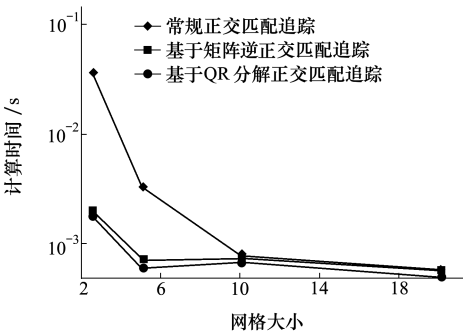
\*^ + " ,8 ] " , 4 • , B• G" Ç z A B•  
 T " K¼m- \*¼Ó±± < Ç z A T " .ú0Ä" Ç  
 z 1ëÓ CB, ì - 7! "1ëÓ ' Y . ,% 9 % + Z  
 ,8 ] "K¼m, 4 • ±±Ë G" ' » P• 3? ±± Xê  
 æ" Dÿ0Äu( ! 6 E ì "œA! ; 3 - Kb! ÓB• T "Ö  
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úŽ±4~i T < & » Ç z T6\* 1 @ÐÄu( ' ±±ž ú  
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 g 3 0 "4~i T < 3 X g 0Ž " " B! " 0! % + @ 4 ' 3  
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EÖô+ @ ,8 ' "U4~i ! D° óKó# " .ú æ"  
 1ëÓ ÖDp"K¼m4~i T " Ö8}±±æ" Ç z 1ëÓ !  
 P "E \ \*^ » Ö8}0Ä" ZFôU³ BUð 0Ä" "U, 4 :



+ @œ4~i T < ; ] @îë Ó±± 2(



+ œ4~i T < ; @Ä#K!±± 2(

U i %œ #6\*! ó- ) Ç z ' , 4 z 4) % + Z U 4~i ? 3! D°ó Kó# Ö8}±±0Ä" ; ' »- Kdo E3B )3±±0Ä" @Ä#K! ÖDp"4 ó Xê0Ä" - 5D# %

### 1/4 ‡ @ç

ý ' - .ú ' » Òc \$ g Ó±±' » P• 3? EL• Ñ f FzE\*CW± ML• 4~4 G, 4 Ç z æ" %A æ" 3 3i ML4~Z' » •ii±±G, 4 Ç z K MÅ DTW g/- \*¼Fú±K MÅEÇDôD\$ / - Kb P• 3? - Kdo E3, M4 Xê æ" Z &- Kb! Ò!o E3"- Ä DýÖÄFüT g Kz{ "ú 59Kz{ 3i ML4~±±6\*5D"ý P £\*L ...• L %; M4 ±±• Ñ f FzE\*CW 4VL- Fú± æ" ,% , ,L4 É=• ; A æ" £ : Ç^ Ç z 1ë Ó"

### ï 50´ ([ Ä

ßÖœ¶ö\_öý ê" Ö6Æ ÄöëöÄÄçöžö èü f Ä•k÷k-U ) ü wçk ö k•œw] !•çü i¶ w 64wzj' wd ¶ w•ç Ä± w¶ .Öžç666 i ç•ç .üçU" O!ß "ß %ßoàß @ßxç 0Öœ Xç i" >6ý X" Ö¶¶ç • Ž•iiK-U ) Ä•üU=Uwç; ç ü ç i ç•ç¶ w•ç çk •çü 4• UÄUwç çâ ¶•çü•çq dUwç Uç •çq dUwç i üd ] .Öžç666 dç •çÆd=üUç üdç•çk" O!ß" x%oà O! @O!"!

° Fz 5BUö 0Ä" E 6\*8ä Ä ! E±±Ç z 1ë Ó "DýÖÄU ( ' , 4 W• ž ú D°T "U ¥ , /- \*¼ 3i ML4~Ž # 8 6D°a ±±@ÄU6\* %

Kq, Ç\$ D/ - Kb P• 3?

Ç)3 œ8 A â t<sup>m×n</sup> % > n o" A A ±±/ g n %Uç' %o = n o" F 6 A<sub>m×n</sub> = Q<sub>m×n</sub> R<sub>n×n</sub> " £ Z Q<sub>m×n</sub> = q<sub>ß</sub> "q<sub>0</sub>" - "q<sub>n</sub> Öq<sub>ß</sub> "q<sub>0</sub>" - "q<sub>n</sub> g A ±±D > Fü M = /\$ K! qUç%o 7 ±±- 3ñ4 ó • Ñ' "R<sub>n×n</sub> g &>ý3i p 2Mg • • ±±\$ / 7 6 >ý- Kb %

@î; œ p<sub>ß</sub> "p<sub>0</sub>" - "p<sub>n-ß</sub> g - 3ñ\*^ HçJ K i üd] ⇒ w• Ñ Ä ] ±±Ä ž - Fü "a<sub>ß</sub> "a<sub>0</sub>" - "a<sub>n</sub> g A ±± D > Fü "Ç v

$$r_{kk} = \hat{A} a_k - p_{k-\beta} \hat{A}$$

< Z "k = ß" 0- n "p<sub>1</sub> = ! %

r<sub>ik</sub> = q<sub>i</sub> a<sub>k</sub> " £ Z i = ß" 0" - k - ß" k = ß" 0- n \*^ HçJ K üd] ⇒ w• Ñ C Ä

$$r_{\beta\beta} \mathbf{a}_{\beta} = \mathbf{a}_{\beta}$$

$$r_{kk} \mathbf{a}_k = \mathbf{a}_k - \bigoplus_{i=\beta}^{k-\beta} r_{i\beta} \mathbf{a}_i$$

< Z "k = 0" - "n % 7 < i ) 3 Ä ]

$$\mathbf{a}_{\beta} = r_{\beta\beta} \mathbf{a}_{\beta}$$

$$\mathbf{a}_k = \bigoplus_{i=\beta}^{k-\beta} r_{i\beta} \mathbf{a}_i - \mathbf{a}_k$$

< Z "k = 0" - "n % R g 7 6 >ý- Kb

$$R = \begin{bmatrix} r_{\beta\beta} & r_{\beta 0} & \dots & r_{\beta n} \\ ! & r_{00} & \dots & r_{0n} \\ \acute{E} & \acute{E} & \bullet & \acute{E} \\ ! & ! & \dots & r_{nn} \end{bmatrix} = \mathbf{r}_{\beta} \mathbf{r}_0 \dots - \mathbf{r}_n \acute{O}$$

F P• .. / ±±0Yj D g

$$Qr_j = \bigoplus_{i=\beta}^{k-\beta} r_{i\beta} \mathbf{a}_i = \mathbf{a}_j$$

& » j = ß" 0" - "n 6

$$QR = \mathbf{a}_{\beta} \mathbf{a}_0 \dots - \mathbf{a}_n \acute{O} = A$$





ô9-VāY! sP9 9Ys¥ Ū Vs-YJB s• é -ã ãçç Rã¥çs-YäY s-§  
' 9çã• s¥ P9çYã -YsVs¥9 9 9YU ¥V xé-éé Y ¥

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z= kŽö ÷ z k Uv= qø& ] " U ] ü vuk w • ùU=U± z Ukø val ] &U > • z P• > ù ] q ±± z • ç !Uw• ød• k zU  
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ü= val z • ç w ç ù ù val qlt üdU±wç= w • i val vuk w ± zU w ç k val" U± val z ü !Uw• ød• k zU  
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q ±± z • i val ù ü ] z !ü øL' ] U±4" val ç üüç ù ù ç = ü > w z ù øval ü&k ±± zU± ] U±4" valü U±= z k  
val > ç ù w z ù ç z • i val ] U±4 z val val ±± zU ] val > " • valUval ù ] qüvU± zU ù ] q 4=¥ = kç Uwf ç > ü ù > Ž  
d ÷ ü U± z ç ü w d valUw ] qlt > ± val val val ±± zU • ød• k zU ] Uùd±k qüç ü= w ] qç > z z k ç K  
ù z valü± z ] val > " val = ] val > > z• w val • ùU=U± z UüüdUf U± ÷ qøù val ù ] qüvU± zU !!±= zùfŽ

P äe s-çã ç z • ç z w • ç + ç ù ù > ± zU w ç k val + !Uw• ød• k zU ] Uùd±k qüç ü= w ù ü ] z !ü øL'  
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