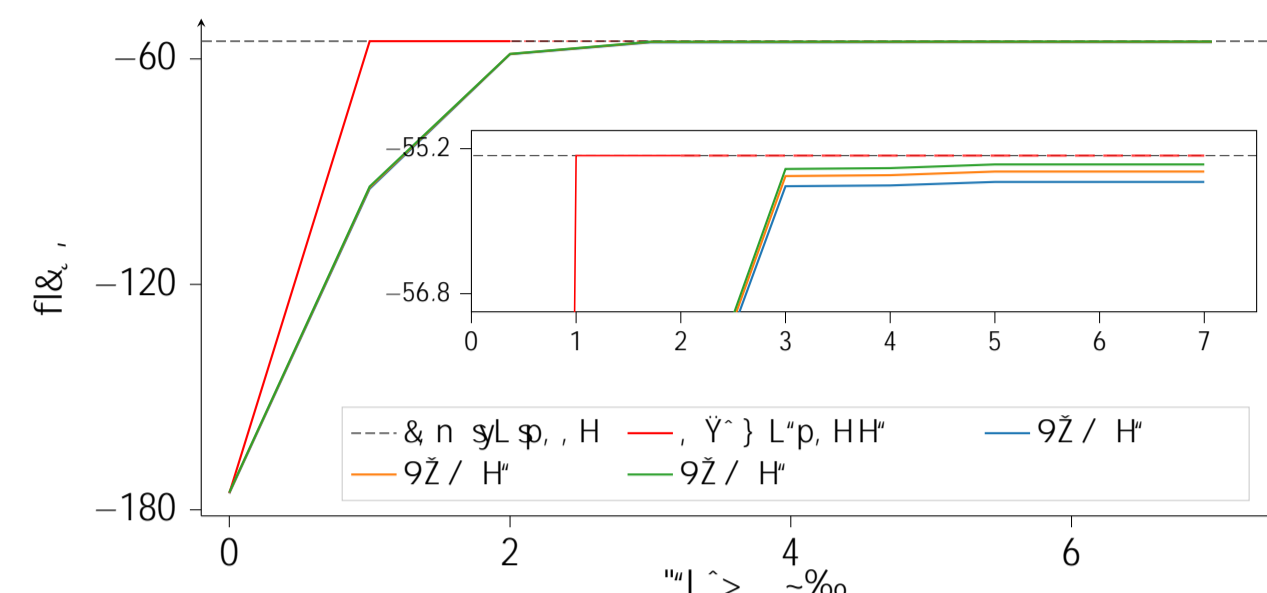




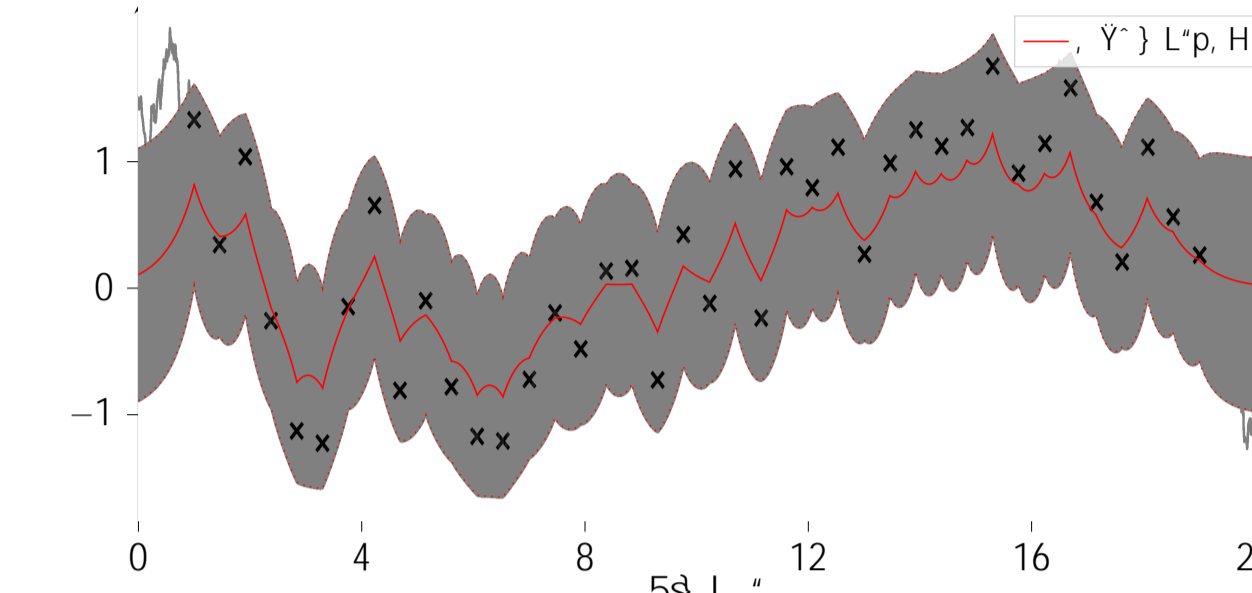
I B1 H

: p> E L H

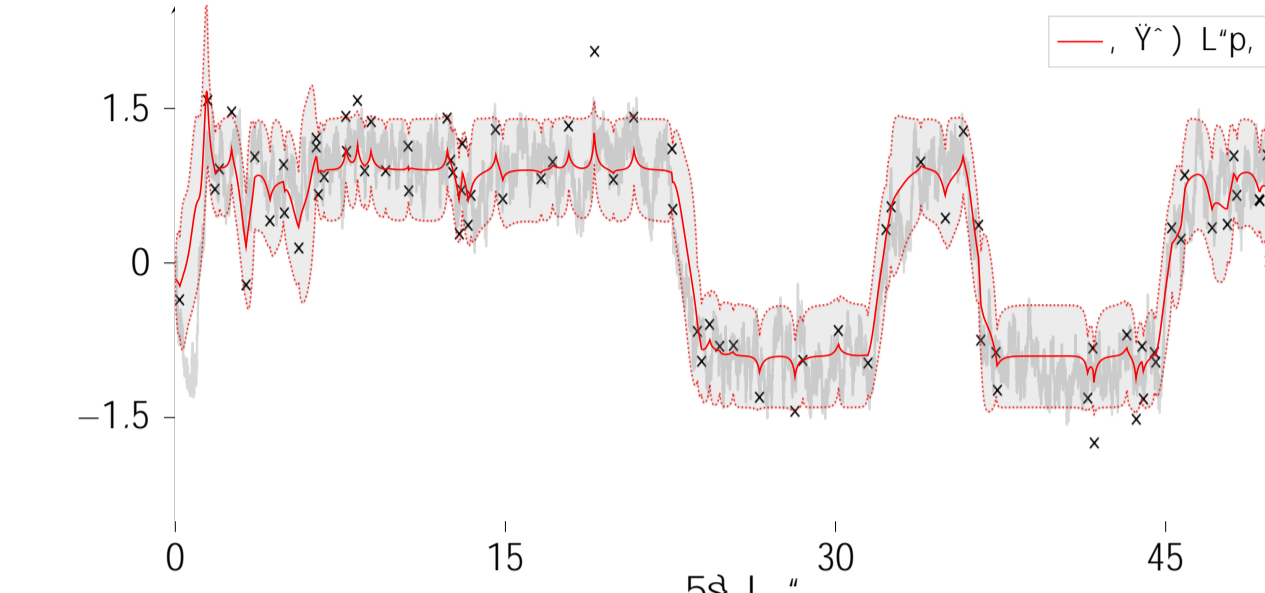
- ...>L' >...>, >L' >...> s-NL'-BL N' nL-L' > CL } , HL %E \$p HsQY%~ ...>, BL%o.s' %o
- &L'CL'>nL >> "L'~> CL ..> } L'L's' >, ~>-H, ... } s' >, ~>n, 's'p } N' Z'>Y%~> >L' >, ~> s-NL'-BL H'>E ~ N, } s'L'>'Y'L, ~ s-L'> HsQY%~> sL Z'>Y%~> ...>, BL%o
- /, ...> %o>> >...>, >L' >L' >, ~> s-NL'-BL >n, 's'p }
- ~, ~-LB' ", ...> %b's' ^ %o >B> s-L'>s' >, ~ N, } %o~> ...>, BL%o n >-H H'>%oB> ¥s' ...>, CL s-NL'-BL } L



f(x) f(x), Y, ..., NfL, ..., CL' s'L', ~%N' pL, ~%Ls- 7pL-By ...>, BL%o 5pL ...>, %H } L'p, H nL' % "pL, ... } > s- W' %o, ~L %b... Y...H' L' E pL' L' > %o "Bp> AL>Y %b' L'p, H' >Y L' %b' Y ...L %b... %o



f(x)) L>>-H B -THL-BL s-L' >, N'pL ...>, %b's' ^, A'>s-LH, ~ ...>, ~%Ls- 7pL-ALBy ...>, BL%o A'pL ...>, %H } L'p, H' ...>, "pL } L'p, H' %o n sL' sL- B> ...>, %b's' ^ %o EL ...>, ~, ~, ~L



f(x)) L>>-H B -THL-BL s-L' >, N'pL ...>, %b's' ^, A'>s-LH, ~ ...>, ~%Ls- 7pL-ALBy ...>, BL%o A'pL ...>, %H } L'p, H' ...>, "pL } L'p, H' %o n sL' sL- B> ...>, %b's' ^ %o EL ...>, ~, ~, ~L

C di kVi 'dc

&>L'~ / sQY%~ / ^, BL%o, HL

H's' (, E~s~), , ~

$$\frac{dx_t}{dt} = f(x_t, t) dt + d_t$$

$$y_i/x \quad p(y_i/x(t))$$

/ ^, A>Ass%B"-NL'-BL

- Z' sL' >H' > %o D = {(t_i, y_i)}_{i=1}^N EL >L' s-L' L' %b's' ^ ...>, BL%o
- p(X/D) = Z^{-1} \prod_{i=1}^N p(y_i/x_i) p(x)
- ~, } ..Y' ~n "p%o, %b's' ^, CL' %o "L' ..> "p%X >-H "pL } >'ns-> sL sp, , H p(y) %s- " >B' >AL : L' L' %o " , >...>, >L' s-NL'-BL

= Vj hhVc KVgVi 'dcVa?c [ZgZcXZ kK'Z

' ...>, >L' "-NL'-BL >%o ... } s' >, ~

9>s' , ~> "-NL'-BL 9" "Y' ~%s-NL'-BL s-", "pL, ... } s' >, ~ ...>, AL }

$$\min_q D_{KL}[q(X) \parallel p(X/D)] = \max_q L(q)$$

E pL' L(q) %pL >L' >, ~> L' c'kZgh-n, EL' A, Y' H fL&,

$$L(q) = E_{q(X)}[\log p(y/x)] - D_{KL}[q(X) \parallel p(X)] < \log p(y)$$

>-H Q %o %o, NH%o s' A'Y, ~ Bp, %o " , } >Y L(q) " >B' >AL >-H " , B' ~>s- >n, H >...>, >L' >, ~, "pL "Y' L' ...>, %b's' ^

Z'>Y%~> >...>, >L' ...>, %b's' ^

: L %o Q = {HsQY%~> %E \$p s-L' >H' s' } = { } >Y, c's- Z' / %o

FVhi I dg' dc = Vj hhVc K?[dgi : ; O7gX] Vb WZVj y E

/> } L' L' s' s-n q 3' f i E \$p s-L' >H' s' >-H %o >LH HsQY%~> E \$p "pL ...s' ^

$$q: dx_t = (A_t x_t + b_t) dt + d_t$$

/ ^, AL } %o

- 3, E T' dL' ... s' , ... } s' >, ~>n, 's'p } N' s-NL'-BL
- (A_t, b_t) } s' "pL ...s' ^ >-H ...>, %b's' ^ A>HN' ^ L' >-s-n

FgdedhZY C Zi] dYO?che 'gVi 'dc

"-%s' >, ~ * >Y' >n' >H' ~ "HL' ~ "N' ^ s-L' >HsQY%~> %o

&s-L' >HsQY%~> Z'>Y%~> / ^, BL%o %o Z' / >L' s-L' ...>, ~L' > N } s' ¥

$$p(x) = \exp(-T(x), p - A(p))$$

) s' ^, ^ >%b' ~ s- L' ...>, ~L' > N } s' ¥ Y' %o n "pL L' A' LB' >, ~ ..> } L' L' s' >, ~

$\mu = E[T(x)]$ E \$p %&..L' > "¥ L' >H%o, L] B' ~ s-NL'-BL s- "pL ~>Y' > ..> } L

"L' s' >, ~ q = p + \int_{Z} \{Z\} %L %o

$$q^{k+1} = \arg \max_q \mu L(q) / \mu = \mu^k, \mu - 1 D_{KL} q \parallel q^k$$

$$q^{k+1} = (1 - \epsilon)^k + \frac{\mu E_{q(X)}[\log p(y/x)]}{B' n' >H' ~ "%o}$$

"-%s' >, ~ 3' > %B' ...>, %b's' ^ s-L' > %o, ~

- "-NL'-BL N' ^ s-L' >HsQY%~> ...>, %o A' L' s- B, %H N' ^ }
-) >-¥ s-NL'-BL } L'p, H %s-B' Y' HL s-L' >s' >, ~, N'pL H' s' f' >, ~n "pL ...>, ~n, s-n >...>, >L' ...>, %b's' ^

$$(A, b) = \arg \min E_{q(X)} Ax + b - f(x) \frac{2}{Q-1}$$

FgdedhZY C Zi] dYO7a dgf] b

: L B } As-L %o %oB> s-L' >s' >, ~>-H } s' ^, ^ >%b' ~ s- "E, %b...%o

- &s-L' >s' L "pL ...s' ^ HsQY%~> p_L^k p > s'L' >L' q^k
- 2Y' ~) s' ^, ^ >%b' ~, ~ L(q) k+1 = \frac{k}{L} + k+1

fL' ...>-H s-n "pL , %o

$$L(q) = E_{q(X)}[\log p(y/x)] + \frac{D_{KL}[q(X) \parallel p_L(X)]}{s-L' >s' >, ~L' ^} - \frac{D_{KL}[q(X) \parallel p(X)]}{\%&, s-L' >s' L' ...s' ^}$$

) / L' >H%o, "pL Y' ..H' >L' %o

$$k+1 = (1 - \epsilon)^k + \frac{\mu \frac{2}{L} fL[q]}{H' > %L %o %o %o} + \left\{ \frac{k - \mu D_{KL}[q \parallel p]}{L' ^, ~ \%L \%o HL' ~ \%o} \right\}$$

FgdeZg 'Zh d[Ej gC Zi] dY

- f, ^ s-L' >HsQY%~> EL' LB' CL' ^ "pL Z' / >n, 's'p } s- ...>, s-L' >s' >, ~L' ^, ^
- f, ^ Z' >Y%~> sL sp, , H' %o pL H' > %L %o L' >Bp "pL s' , ... } > >L' s- > %o n L %b...N' ^ = 1
- / LB' Y' ...s-n "pL ...s' ^ H' > >-H L' ^, ^ B' ~> s' A'Y, ~, "pL ...>, %b's' ^ L' >H%o, N' %b' ^ L' >-s-n, N'pL p' ¥ ..L' ...> } L' L' %o, N'pL HsQY%~> k+1 = \frac{k}{L} + k+1

; meZgb Zcih

&s-L' >...>, BL%o %o s' ^ 5pL , ^ ~%Ls- 7pL-ALBy ...>, BL%o d sn

$$dx_t = x_t dt + d_t$$

- ~, } ..>L' >n>s-%o "pL } L'p, H, N' ^ Bp> } AL>Y' L' >
- 3s-n L' %b...Y' ..H' >L' N' ^ s-NL'-BL %o A' >s-LH

* , ~ s-L' >...>, BL%o %o s' ^ 5pL H, YAL EL' ...>, BL%o d sn

$$dx_t = 4x_t(1 - x_t^2) dt + d_t$$

9dcXaj h'dc

- "L' >-> CL' %L A' >H' ..> } L' L' s' >, ~ N' ^ nL-L' > CL } , HL %E \$p HsQY%~> ...>, BL%o %o s' ^ %b' , >L' H A' Y' ^ L' B' ~>H' >-> BL' %s- Z' >Y%~> ...>, BL%o %o
- ~, ~-LB' ~n E \$p "pL s'L' >'Y' L, ~ ...>, %b's' ^ %o %oB> s-L' >s' >, ~
- / ^ >%oB> ¥s' ...>, CL s-NL'-BL } L' s- ...>, BL%o %o E \$p s-L' > %E L' >%o ~, ~ s-L' >HsQY%~> ...>, BL%o %o s' ^ %o

HZ[ZgZcXZ h

9' H } / ^ p>n) fL' fL' p>->H' 3, s- / Y' >...> } L' L' s' >, ~, N' %o %o c' >s' , ~> Z' >Y%~> ...>, BL%o %o H' >-> BL' %s- * L' Y' > "-N' } >, ~ / ^, BL%o n 3' %b' } %o

" ^ Bp> } AL>Y' / ^, ~N' H') , ...L' >-H' 3p>EL' 5' ¥, ^ Z' >Y%~> ...>, BL%o ...>, >L' >, ~%o N' %o Bp>B' HsQY%~> >L' Y' >, ~%o s- Z' >Y%~> / ^, BL%o %o / >B' BL' / ^, BL' H' s-n %o) >Bp s-L' &L' >-s-n 2L' %o Bp /) &2

3 3 'yy >-H' 3, s- ' ...>L' H' 3' Bp>%B' >L' L' > fL' Y' >, ~%o

' > } A' s' hL' 7- >L' %s' / L' %o