?

Scipy

pyOpt

$\min_{x_k} f(x)$
x_{k+1}**?**

??

A

B

C

A

$r_{0,1}$

$r_{0,3}$

0

B

s_3

$r_{0,3}$

$r_{3,2}$

C

$_hidden/.style =$

$verythick, dashed, polygon/.style =$

$verythick, black, axis/.style =$

$-, blue, thick, point/.style =$

$verythick, black]$

$r_{0,3}$

$r_{0,1}$

$r_{3,0}$

s_3

$\bullet B$

$\bullet A$

$\bullet C$

?

A

B

C

C

-1

N_s

N_s

?

**al-
go-
rithm
re-
lated
op-
ti-
miza-
tion
solver
re-
lated**

N_s

n_{knots}

T_p

T_c

??

$first$

$in-
ter$

$last$

$MAXIT_{first}$

$MAXIT_{inter}$

$MAXIT_{last}$

10^{-3}

$max-
i-
mum
com-
pu-
ta-
tional
time$

1

T_c

$max-
i-
mum
com-
pu-
ta-
tional
time T_c$

T_c

T_p

N_s

N_{knots}

$max-
i-
mum
com-
pu-
ta-
tional
time T_c$

??

N_s

N_{knots}

$max-
i-
mum
com-
pu-
ta-
tional
time T_c$

T_c/T_p

N_s

$max-
i-
mum
com-
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ta-
tional
time T_c$

T_c/T_p

N_s

N_{knots}

N_{knots}

N_s

max-
i-
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pu-
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tional
time T_c

$3_{N k nots_4}/mcttc-tctp.eps$ $Four internal knots. Average variance between line sis \times 10^{-2}$

$3_{N k nots_5}/mcttc-tctp.eps$ $Five internal knots. Average variance between line sis \times 10^{-2}$

$3_{N k nots_6}/mcttc-tctp.eps$ $Six internal knots. Average variance between line sis \times 10^{-2}$

??

T_p

T_c

N_s

N_{knots}

v_{max} 1.00 m/s

ω_{max} 5.00 rad/s

q_{inital} $[-0.050.00\pi/2]^T$

q_{final} $[0.107.00\pi/2]^T$

u_{final} $[0.000.00]^T$

u_{final} $[0.000.00]^T$

O_0 $[0.551.910.31]$

O_1 $[-0.083.650.32]$

O_2 $[0.384.650.16]$

$_r esults/p_{30}.48_2.4_1 1_4 0.001_1 5_4 0_2 0_5.0_0.1_3.0_0.5_1.0_1 0.0/multirobot-$
path.png $Robot's path.$

$_r esults/p_{30}.48_2.4_1 1_4 0.001_1 5_4 0_2 0_5.0_0.1_3.0_0.5_1.0_1 0.0/multirobot-$
vw.png $Robot's input.$

max-
i-
mum
com-
pu-
ta-
tional
time
T_c

$7.57s$

$6_{N\,knots_4}/mcttc-tctp.eps$ $Four internal knots. Average variance between line is \times 10^{-2}$

$6_{N\,knots_5}/mcttc-tctp.eps$ $Five internal knots. Average variance between line is \times 10^{-2}$

$6_{N\,knots_6}/mcttc-tctp.eps$ $Six internal knots. Average variance between line is \times 10^{-2}$

T_p

T_c

N_s

N_{knots}

v_{max} 1.00m/s

ω_{max} 5.00rad/s

q_{inital} $[-0.05 0.00 \pi/2]^T$

q_{final} $[0.10 7.00 \pi/2]^T$

u_{final} $[0.00 0.00]^T$

u_{final} $[0.00 0.00]^T$

O_0 $[-0.35 1.36 0.39]$

O_1 $[0.21 2.53 0.33]$

O_2 $[-0.32 4.86 0.23]$

O_3 $[0.10 3.98 0.31]$

O_4 $[0.62 1.25 0.18]$

O_5 $[1.17 3.66 0.25]$

$_results/p_{61}.28_3.2_12_{60}.001_15_40_20_5.0_0.1_3.0_0.5_1.0_1 0.0/multirobot-path.png Robot's path.$

$_results/p_{61}.28_3.2_12_{60}.001_15_40_20_5.0_0.1_3.0_0.5_1.0_1 0.0/multirobot-vw.png Robot's input.$

maximum computational time T_c

7.76s