

Table 1 Notation concerning the vehicle and engine

Symbol	Significance	Unit
v	vehicle velocity	m/s
Δv	vehicle acceleration	m/s^2
s	vehicle distance	m
M	vehicle mass	kg
$\frac{1}{2}\rho C_d A$	aerodynamic resistance	N
F_t	vehicle driving torque	$N \cdot m$
F_b	vehicle braking torque	$N \cdot m$
$c_r g$	rolling resistance	N
α	road slope	$\%$
m	injection quantity	$mg/cycle$
γ	openness of EGR valve	—
θ	fuel injecting angle	—
β	openness of VGT valve	—
T_e	engine output torque	Nm
b_i	fuel consumption	g/kWh

Table 2 Selection of parameters and constraints in simulation

Parameter name	value
ω_1	10^{-8}
ω_2	10^{-8}
v_{min}	0
v_{max}	13
Δv_{min}	0
Δv_{max}	15
F_{tmin}	0
F_{tmax}	12000
F_{bmin}	0
F_{bmax}	8000
u_{min}	$[0, 0, -10, 0]^T$
u_{max}	$[40, 0.3, 10, 1]^T$
Δu_{min}	$[-4, -0.03, -1, -0.1]^T$
Δu_{max}	$[4, 0.03, 1, 0.1]^T$

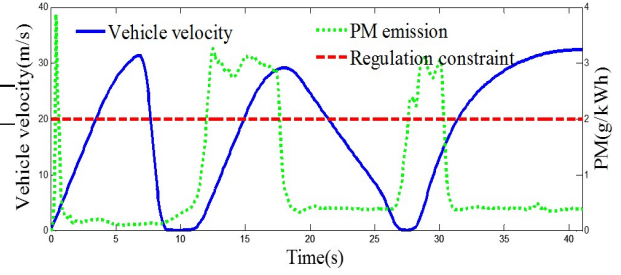


Figure 1 Vehicle velocity and emission

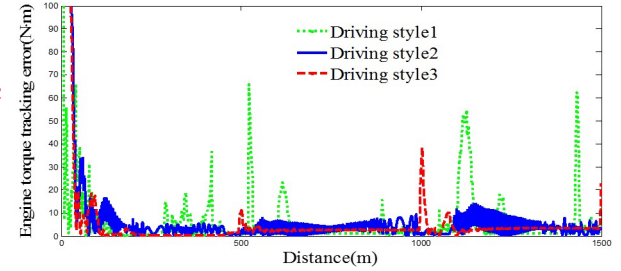


Figure 2 Engine torque tracking error

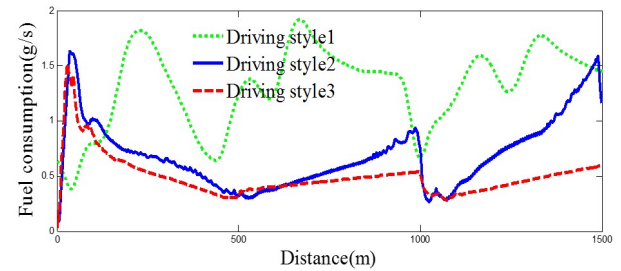


Figure 3 Fuel consumption