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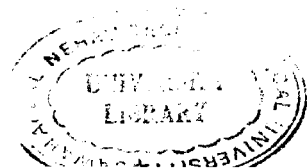
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NOMENCLATURE

A_i	joint screw in the base frame
B_i	joint screw in the end-effector frame
$B_{j,k}$	quintic B-spline basis function
d	translation
f	force
f_c	Coulomb friction
f_v	viscous friction
F	spatial force vector
F_c	contact force (or the Lagrange multiplier)
F_{n+1}	external spatial force on the last link or end-effector
\hat{F}_i	bias force associated with link i
\mathfrak{g}	Lie algebra of G
G	differentiable manifold
h	pitch of the screw A_i
$h(q, \dot{q})$	contains the centrifugal, Coriolis, gravitational and frictional forces
$H(q)$	mass or inertia matrix
i_p	passive joint index
J	spatial inertia matrix
J_c	Jacobian matrix
\hat{J}_i	articulated-body inertia of link i
J_c^b	body Jacobian
k	order of the basis polynomial
k_1 and k_2	positive constants of the characteristic equation, $s^2 + k_1 s + k_2 = 0$
k_i	screw axis direction
\mathcal{P}	set of active joints in which the forward dynamics is applied
I_i	inertia of the i^{th} link
\mathcal{P}	set of passive joints in which the inverse dynamics is applied
l_{foot}	vertical distance between the ankle and sole of the foot (ground)
l_{heel}	horizontal distance between the ankle and heel

l_{hip}	distance between the right and left hip joint center locations
$l_{lower\ leg}$	length of lower leg
l_{toe}	horizontal distance between the ankle and toes
$l_{upper\ leg}$	length of upper leg
m	moment
m_i	mass of the i^{th} link
N	number of the joints
n_a	number of actuated joints
p	point location in Cartesian space
(P, I)	point location homogeneous coordinates
(p_0, \dots, p_m)	set of the control points
P'	position of a rigid point
q_i	joint variable for link i
$q \in \mathbb{R}^{10}$	joint coordinates
q_{jfp} and \dot{q}_{jfp}	final joint position and velocity respectively
\dot{q} and \ddot{q}	time derivatives to the joint positions q
\dot{q}	generalized velocity of the robot manipulator
\hat{r}_i	skew symmetric matrix formed by r_i
r_i	vector from the origin of the i^{th} link frame to the center of mass of i^{th} link
R	rotation
S	joint screw
s_1 and s_2	roots of the characteristic equation, $s^2 + k_1s + k_2 = 0$
$se(3)$	Lie algebra of $SE(3)$
$SE(3)$	special Euclidean group
S_i	screw in the coordinates of the local moving frame for link i ,
$SO(3)$	Lie group
$so(3)$	Lie algebra of $SO(3)$
$t_0, \dots, t_k, \dots, t_m, \dots, t_{m+k}$	knots of B-spline curve
T	homogeneous transformation matrix
$T_{i-1,i}$	transformation from the $(i-1)^{th}$ link frame to the i^{th} link frame
v	linear velocity
v_e	linear velocity of the end-effector

V	spatial velocity
V_0	spatial velocity of the base
\dot{V}_0	acceleration of the base
\ddot{V}	spatial acceleration
V_e	spatial velocity of the end-effector
V_e^R	spatial velocity of the end-effector written in the base frame
w_e	angular velocity of the end-effector
w_{ei} 's	positive weighting coefficients
τ_1, τ_2 and τ_3	generalized forces associated with the translation of the stance hip
τ_4 and τ_5	moments corresponding to the rotations of the stance hip τ_4 , τ_5 , and τ_6 swing hip moments
τ_9 and τ_{10}	knee and ankle rotation moments
τ_c	torque due to the contact between the robot and the environment
τ	joint forces or torques
τ_{mvd}	muscular forces or torques
ω	angular velocity