Exact Derivative Propagation Method to compute the Generalized Compliance Matrix for Continuum Robots: Application to Concentric Tubes Continuum Robots

Variable mapping between the MMT article and the Matlab code

Variable in the paper	**Variable in the code**
ϵ	`simulation_param.opt_tol`
nbT	`ctcr_carac.nbT`
kx_i	`ctcr_carac.stiff(i)`
R_{ci}	`ctcr_carac.Rc(i)`
L_{ri}	`ctcr_carac.Lr(i)`
L_{ci}	`ctcr_carac.Lc(i)`
L_i	`ctcr_carac.L(i)`
N	`ctcr_construc.nbP`
s	`ctcr_construc.vect_z`
0_i	`ctcr_construc.vect_z(ctcr_construc.vect_ind_iT(i,1))`
$\beta_{ci} - L_{ci}$	`ctcr_construc.vect_z(ctcr_construc.vect_ind_iT(i,2))`
β_{ci}	`ctcr_construc.vect_z(ctcr_construc.vect_ind_iT(i,3))`
0	`ctcr_construc.vect_z(ctcr_construc.ind_origin)`
$\Delta(s)$	`ctcr_construc.vect_res`
K_i	`ctcr_construc.K(1:3,1:3,i)`
$\dot{\tau}_0(s)$	`ctcr_construc.vect_tau_dist`
$\dot{f}_0(s)$	`ctcr_construc.vect_f_dist`
u_i^*	`ctcr_construc.ui_init`
$\tau_0(L_0)$	`ctcr_load.tau_tip`
$f_0(L_0)$	`ctcr_load.f_tip`
$[l_{min}, l_{max}]$	`ctcr_load.load_lim_1/2`
$\tau_0(s_0)$	`ctcr_load.tau_dist_1/2`
$f_0(s_0)$	`ctcr_load.f_dist_1/2`
θ_{ci}	`ctcr_act.theta_c(i)`
β_{ci}	`ctcr_act.beta_c(i)`
b	`bvp_prop.vect_tol`
$\|b\|$	`bvp_prop.norm_tol`
$B_{y_u(0)}$	`bvp_prop.Bu`

Variable in the paper	**Variable in the code**
$y(s)$	`mem_bvp.mem_y`
$\dot{y}(s)$	`mem_bvp.mem_ys`
$u_i\|_{x,y}(s)$	`mem_bvp.mem_uixy`
$u_0(s)$	`mem_bvp.mem_u0`
$T_0(s)$	`mem_bvp.mem_T`
$\frac{\partial u_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_du0`
$\frac{\partial m_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dm0`
$\frac{\partial \dot{m}_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dm0_ds`
$\frac{\partial n_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dn0`
$\frac{\partial \dot{n}_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dn0_ds`
$\frac{\partial \theta_i}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dti`
$\frac{\partial \dot{\theta}_i}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dti_ds`
$\frac{\partial u_i\|_z}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_duzi`
$\frac{\partial \dot{u}_i\|_z}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_duzi_ds`
$\frac{\partial R_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dR0`
$\frac{\partial \dot{R}_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dR0_ds`
$\frac{\partial p_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dP0`
$\frac{\partial \dot{p}_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dP0_ds`
$\frac{\partial T_0}{\partial \chi}(s)$	`mem_deriv_propag_low.mem_dT0`
B_χ with $\chi \in \{y_u(0), q\}$	`mem_deriv_propag_high.mem_B`
B_χ with $\chi \in \{w_0(s_0)\}$	`mem_deriv_propag_high.mem_Bws0`
E_χ with $\chi \in \{y_u(0), q\}$	`mem_deriv_propag_high.mem_E`
E_χ with $\chi \in \{w_0(s_0)\}$	`mem_deriv_propag_high.mem_Ews0`
$C_{s_0}(s)$	`mem_CJ.mem_Cs0`
$J(s)$	`mem_CJ.mem_J`