

Table S1. Summary of available cost function terms for Tracking, Verification, and Design Optimization.

<i>Cost Term</i>	<i>Component Type</i>	<i>Tracking Optimization</i>	<i>Verification Optimization</i>	<i>Design Optimization</i>
generalized_coordinate_tracking	coordinate	✓	✓	✓
generalized_speed_tracking	coordinate	✓	✓	✓
generalized_acceleration_tracking	coordinate	✓	✓	✓
generalized_acceleration_minimization	coordinate	✓	✓	✓
marker_position_tracking	marker	✓	✓	✓
marker_velocity_tracking	marker	✓	✓	✓
body_orientation_tracking	body	✓	✓	✓
body_orientation_minimization	body	✓		✓
inverse_dynamics_load_tracking	load	✓		✓
inverse_dynamics_load_minimization	load	✓		✓
inverse_dynamics_slope_tracking	load	✓		✓
external_force_tracking	force	✓		✓
external_moment_tracking	moment	✓		✓
center_of_presssure_tracking	hindfoot_body	✓		✓
muscle_activation_tracking	muscle	✓		✓
muscle_activation_minimization	muscle	✓		✓
synergy_vector_tracking	synergy	✓		✓
synergy_vector_symmetry	synergies	✓		✓
controller_tracking	controller	✓	✓	✓
controller_minimization	controller	✓		✓
controller_slope_minimization	controller	✓		✓
controller_shape_tracking	controller			✓
joint_energy_generation_goal	coordinate			✓
joint_energy_absorption_goal	coordinate			✓
inverse_dynamics_shape_tracking	load			✓
angular_momentum_minimization	none			✓
relative_walking_speed_goal	none			✓
absolute_metabolic_cost_per_time	none			✓
absolute_metabolic_cost_per_distance	none			✓
relative_metabolic_cost_per_time	none			✓
relative_metabolic_cost_per_distance	none			✓
propulsive_impulse_goal	hindfoot_body			✓
braking_impulse_goal	hindfoot_body			✓
user_defined	any			✓