Table S2. Summary of available constraint terms for Tracking, Verification, and Design Optimization.

Constraint Term	Component Type	Tracking Optimization	Verification Optimization	Design Optimization
generalized_coordinate_deviation	coordinate	✓	✓	✓
generalized_coordinate_value	coordinate	✓	✓	✓
generalized_coordinate_periodicity	coordinate	✓	✓	✓
initial_generalized_coordinate_deviation	coordinate	✓	✓	✓
initial_generalized_coordinate_value	coordinate	✓	✓	✓
final_generalized_coordinate_deviation	coordinate	✓	✓	✓
final_generalized_coordinate_value	coordinate	✓	✓	✓
generalized_speed_deviation	coordinate	✓	✓	✓
generalized_speed_value	coordinate	✓	✓	✓
generalized_speed_periodicity	coordinate	✓	✓	✓
initial_generalized_speed_deviation	coordinate	✓	✓	✓
initial_generalized_speed_value	coordinate	✓	✓	✓
final_generalized_speed_deviation	coordinate	✓	✓	✓
final_generalized_speed_value	coordinate	✓	✓	✓
generalized_acceleration_deviation	coordinate	✓	✓	✓
generalized_acceleration_value	coordinate	✓	✓	✓
marker_position_deviation	marker	✓	✓	✓
marker_position_value	marker	✓	✓	✓
marker_position_periodicity	marker	✓	✓	✓
initial_marker_position_deviation	marker	✓	✓	✓
initial_marker_position_value	marker	✓	✓	✓
final_marker_position_deviation	marker	✓	✓	✓
final_marker_position_value	marker	✓	✓	✓
marker_velocity_deviation	marker	✓	✓	✓
marker_velocity_value	marker	✓	✓	✓
marker_velocity_periodicity	marker	✓	✓	✓
initial_marker_velocity_deviation	marker	✓	✓	✓
initial_marker_velocity_value	marker	✓	✓	✓
final_marker_velocity_deviation	marker	✓	✓	✓
final_marker_velocity_value	marker	✓	✓	✓
body_orientation_deviation	body	✓	✓	✓
body_orientation_value	body	✓	✓	✓
body_orientation_periodicity	body	✓	✓	✓
initial_body_orientation_deviation	body	✓	✓	✓
initial_body_orientation_value	body	✓	✓	✓
final_body_orientation_deviation	body	✓	✓	✓
final_body_orientation_value	body	✓	✓	✓
kinetic_consistency	load	✓	✓	✓
root_segment_residual_load	load	✓	✓	✓
root_segment_residual_load_periodicity	load	✓	✓	✓
external_force_deviation	force	✓	✓	✓

external_force_value	force	✓	✓	✓
external_force_periodicity	force	✓	✓	✓
initial_external_force_deviation	force	✓	✓	✓
initial_external_force_value	force	✓	✓	✓
final_external_force_deviation	force	✓	✓	✓
final_external_force_value	force	✓	✓	✓
external_moment_deviation	moment	✓	✓	✓
external_moment_value	moment	✓	✓	✓
external_moment_periodicity	moment	✓	✓	✓
initial_external_moment_deviation	moment	✓	✓	✓
initial_external_moment_value	moment	✓	✓	✓
final_external_moment_deviation	moment	✓	✓	✓
final_external_moment_value	moment	✓	✓	✓
center_of_pressure_deviation	hindfoot_body	✓		✓
center_of_pressure_value	hindfoot_body	✓		✓
muscle_activation_deviation	muscle	✓	✓	✓
muscle_activation_value	muscle	✓	✓	✓
controller_deviation	controller	✓	✓	✓
controller_value	controller	✓	✓	✓
synergy_vector_sum	synergy	✓		✓
synergy_vector_magnitude	synergy	✓		✓
synergy_vector_symmetry	synergies	✓		✓
limit_normalized_fiber_length	muscle			✓
user_defined	any			✓