The table below compares and contrasts different inverse methods. Not all methods are available from within the OpenSim graphical user interface (GUI) (see the "Available Interfaces" column below). Adapted from <https://simtk-confluence.stanford.edu:8443/display/OpenSim/Overview+of+OpenSim+Workflows#OverviewofOpenSimWorkflows-_Toc174680178>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **METHOD** | **GOAL** | **KEY CONSIDERATIONS** | **AVAILABLE INTERFACES** | **RESOURCES** |
| **Inverse dynamics** | Calculate joint torques from a measured motion | Straightforward; minimal assumptions | GUI  CMD\*  C++ \*\* | [Overview](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Overview+of+OpenSim+Workflows#OverviewofOpenSimWorkflows-Overview_InverseDynamics)  [User Guide: Inverse Dynamics](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Inverse+Dynamics)  [Hands-on Example (Beginner): Scaling, Inverse Kinematics, and Inverse Dynamics](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Tutorial+3+-+Scaling%2C+Inverse+Kinematics%2C+and+Inverse+Dynamics) |
| **Static optimization** | Estimate muscle force/activations from a measured motion | Fast estimation; assumes rigid tendons; minimizes activation squared at each time step | GUI  CMD\*  Scripting \*\* | [Overview](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Overview+of+OpenSim+Workflows#OverviewofOpenSimWorkflows-Overview_StaticOptimization)  [User Guide: Static Optimization](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Static+Optimization)  [Hands-on Example (Intermediate): Working with Static Optimization](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Working+with+Static+Optimization)  [Hands-on Example (Intermediate): Estimating Leg Muscle Forces in Stance and Swing](https://simtk-confluence.stanford.edu:8443/display/OpenSim/The+Strength+of+Simulation%3A+Estimating+Leg+Muscle+Forces+in+Stance+and+Swing) |
| **Computed muscle control (CMC)** | Estimate muscle excitations from a measured motion | Excitation-activation dynamics; accounts for tendon stretch;  minimizes activation squared at each time step | GUI  CMD\* | [Overview](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Overview+of+OpenSim+Workflows#OverviewofOpenSimWorkflows-Overview_CMC)  [User Guide: Computed Muscle Control](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Computed+Muscle+Control)  [Hands-on Example (Intermediate): Computed Muscle Control](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Example+-+Computed+Muscle+Control)  [Hands-on Example (Intermediate): Estimating Leg Muscle Forces in Stance and Swing](https://simtk-confluence.stanford.edu:8443/display/OpenSim/The+Strength+of+Simulation%3A+Estimating+Leg+Muscle+Forces+in+Stance+and+Swing)  [CMC Theory and Publications](https://simtk-confluence.stanford.edu:8443/display/OpenSim/RRA+and+CMC+Theory+and+Publications) |
| **EMG-informed methods** | Estimate musculotendon parameters given a measured motion and muscle activity | Normalizing muscle activity is necessary | CMD\*  Scripting \*\* | [Overview](https://simtk-confluence.stanford.edu:8443/display/OpenSim/Overview+of+OpenSim+Workflows#OverviewofOpenSimWorkflows-Overview_EMGInverse)  [Calibrated EMG-Informed Neuromusculoskeletal Modeling (CEINMS) Toolbox](https://simtk.org/projects/ceinms) |

\*"Command Line" refers to the interactive, text-based interface within OpenSim.

\*\*"Scripting" refers to calling commands from other languages, specifically MATLAB and Python.