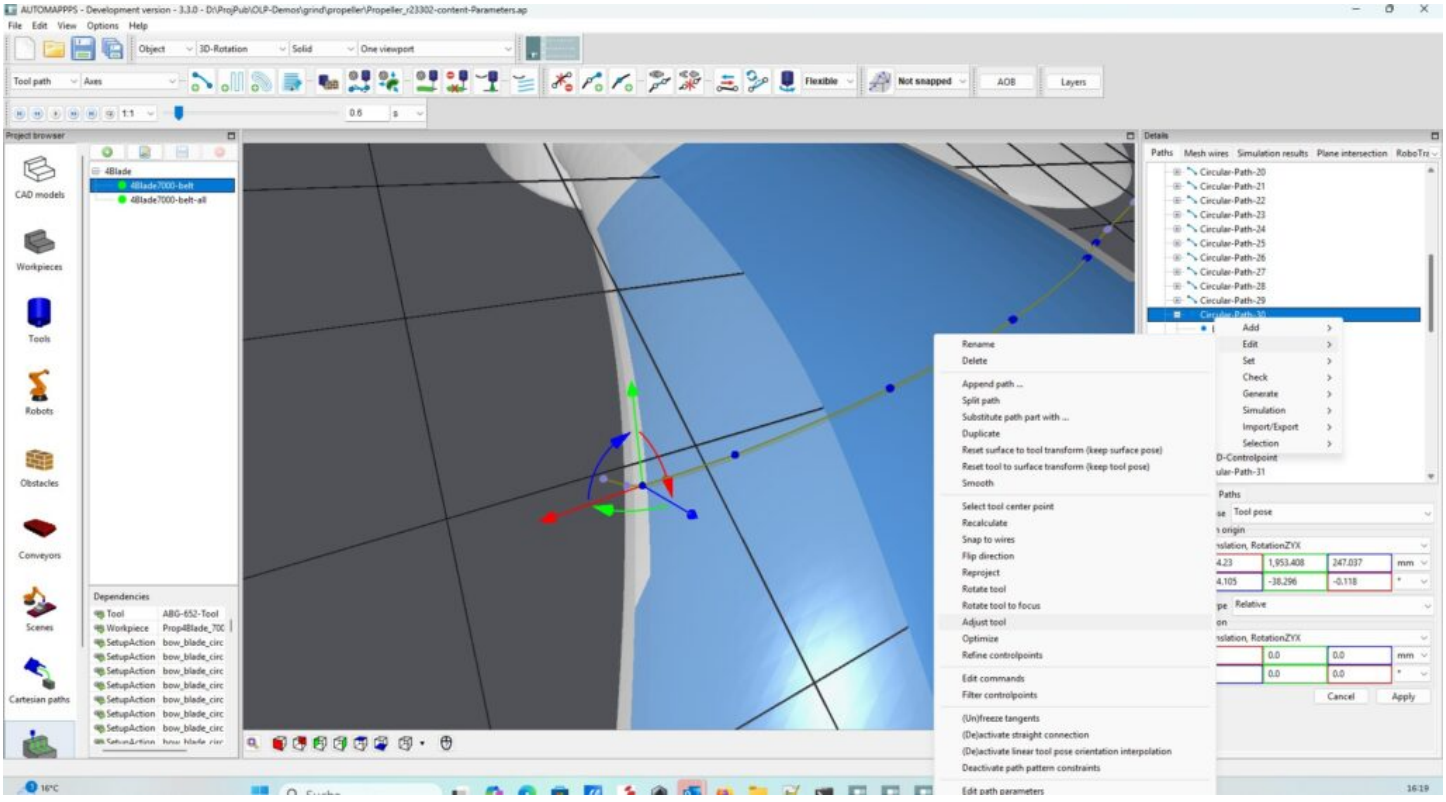
OLP – Optimization and Adjustment Parameter

Settings and Parameters for Robot Offline Programming · https://convergent-it.com/tutorial/robot-olp-parameters-settings/olp-optimization-and-adjustment-parameter/

Tool Adjustment

The tool adjustment tries to identify solutions for a path which ist unreachable by the robot (and external axes). For this task the algorithm varies the tool position and orientation in given ranges and validates if the pose - with those modifications - is not collision free reachable by the robot. This is possible also for moving-line and with external robot axes.

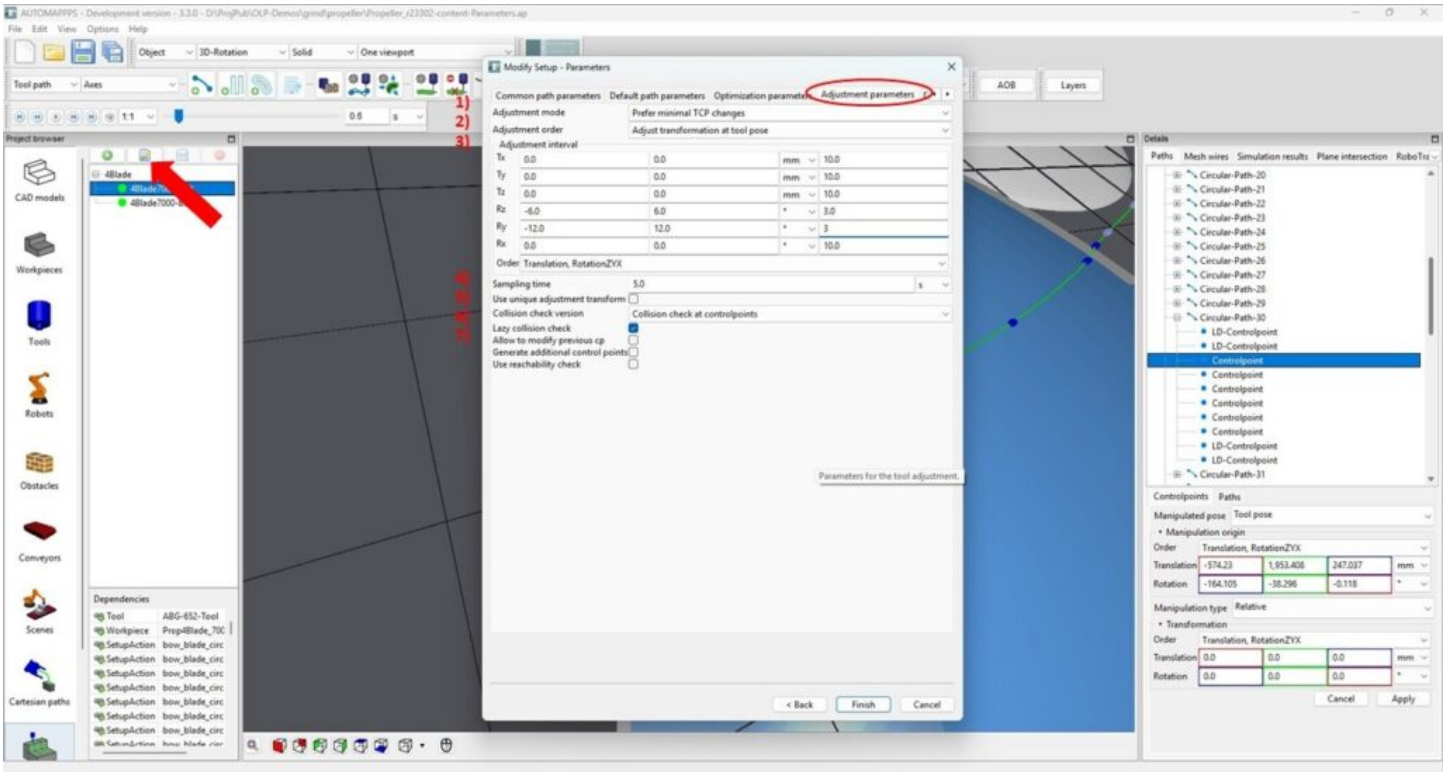


During robot offline programming you can request the automatic tool adjustment as shown above for one or many tool-paths. The method is similarly applied in 100% reactive robot applications that are

fully automatically plannend.

Adjustment Parameters

The tool adjustment uses upfront defined default values, in order to comply with specifications by the process or user.



The parameters used in Tool adjustment are as follows:

1. Adjustment mode: Strategy the algorithm uses to find a solution. For more details see below.
2. Adjustment order: The adjustment can be done at the tool-pose or at the surface pose. This is for real experts only: use tool-pose or do not change the settings the line-builder has chosen.
3. Adjustment interval: The 6*3 parameters describe per X,Y,Z, Rx,Ry,Rz the lower and upper borders the specific dimension can be changed plus the discretization ()
4. Sampling time: the algorithm serches for solutions each N seconds, considering changes over time in the workflow. Obviously most important for moving line, but also if auxilary axis`s motions are defined.
5. Unique adjustment transform: If [X], all control-points are modified identically. If [ ], the algorithm can change the path at some points more than at others to achieve reachibilty.

6. Collision check version: Strategy the algorithm uses to check for collisions. For more details see below.
7. Lazy collision check ON-OFF
8. and more:
    - Allow to modify previous control-point
    - Generate additional control-point
    - Use reachability check

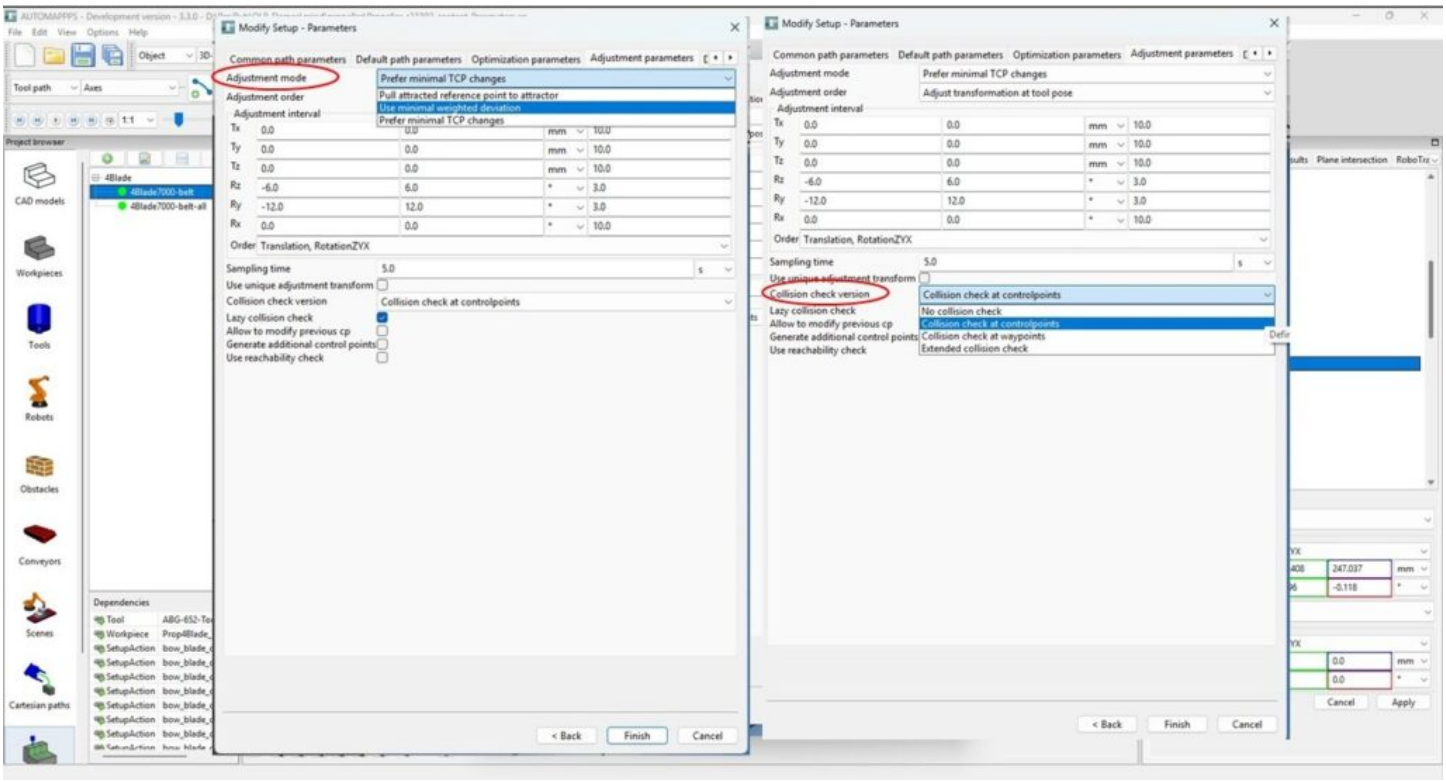


Image Left: 3 adjustment modes are available:

- Pull attracted Reference Point to an attractor: In this mode you can have a reference point (usally) attached to the tool (defined in the CAD Editor) to be pulled to an usually remote point or to an central point you define. By that you can e.g. force the flange to point in one direction while the tool makes arbitrary motions.
- Use minimal weigthed deviation:
- Prefer minimal TCP change: More computational intense than the second option since alle possible deviations are checked. Especially if you use moving line or multiple additional axes of high resolution, use "lazy collision check" to prevent the computation gets slow.

Image right: 4 Collision check versions available

- No collision check: Ignore collisions, test only for reachability
- Collision check at control-points: Used for short motions with dense control-points. Only the control-points are checked. Not sampled way-points inserted in between.
- Collision check at waypoints: Collision check is also done at waypoints automatically inserted.
- Extended collision check: the entire path is checked for collisions even inbetween waypoints. This method is slower and only in rare conditions needed at all.