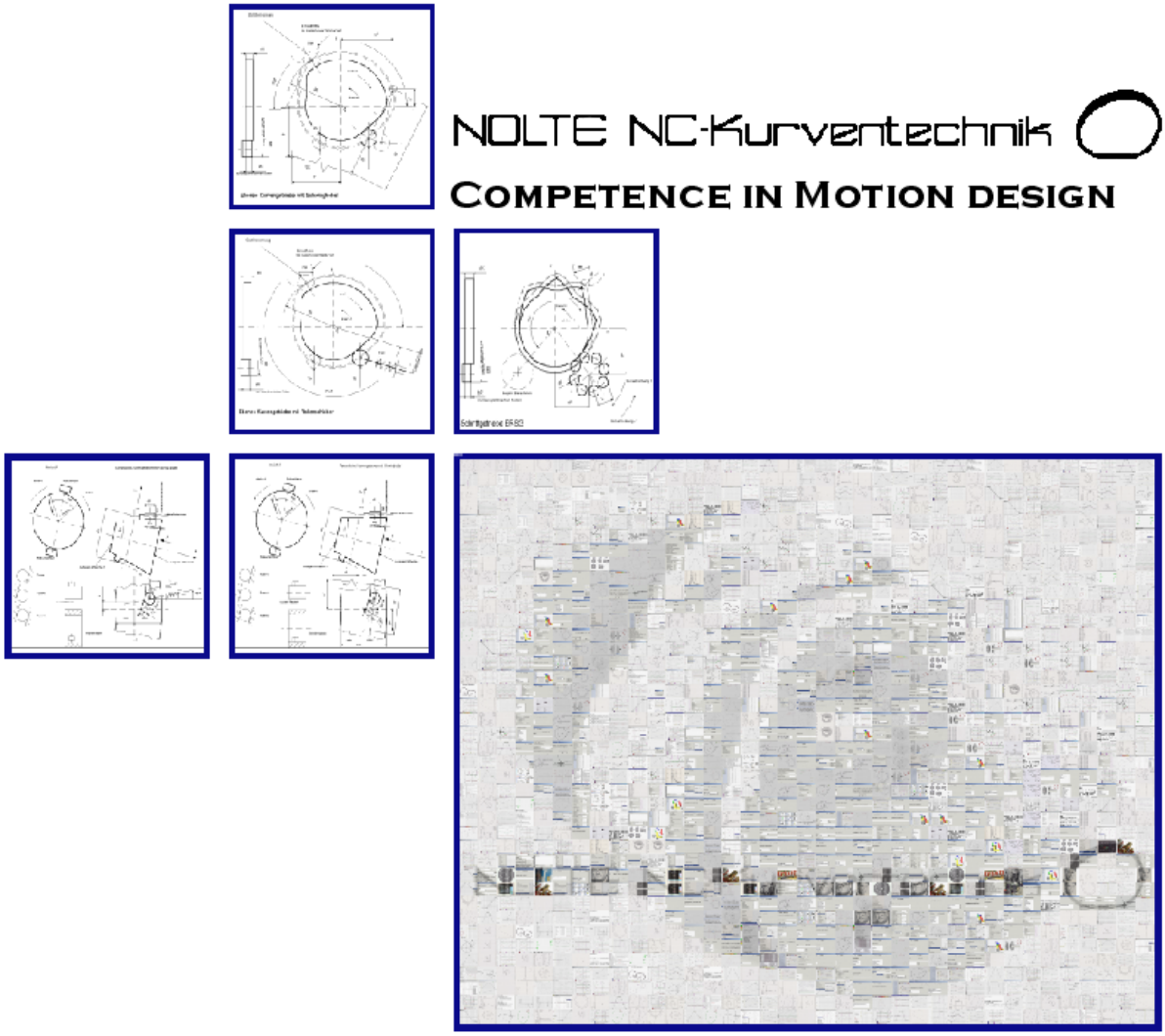
Mechanism Software CAD-OPTIMUS MOTUS ®



NOLTE NC-Kurventechnik

COMPETENCE IN MOTION DESIGN

Mechanism Software CAD-OPTIMUS MOTUS ®:

- **Planar mechanisms** with revolute joints, slider joints, linear joints and general cam joints
- Precise consideration of **spatial coupler rods**
- Modeling of open and closed-loop **chains** and **belts** with circular and noncircular wheels
- Userspecific **formulas** as constraints for the simulation
- **Planar and cylindrical cams, indexing cam gears, servo drives**
- Analysis and synthesis of non-circular wheels
- Steady and **non-steady actuations**, time base transformation
- **Available laws of motion:** german VDI 2143 + polynomial interpolation + splines (with smoothing) + higher laws of motion + Fourier synthesis (hs-profiles) + tables + automatic adjustment of boundary values + synchronous regions
- Grafhic definition of the motion scheme
- **Automatic generation of the displacement diagram out of the motion scheme with optimal acceleration**
- Grafic optimization of the displacement diagram
- Diagrams and lists for all evaluation quantities
- Evaluation with path, velocity, acceleration, jerk, Fourier analysis, transmission angle, radius of curvature
- **2D/3D-data exchange (DXF, IGES, MI, VRML, DAT, PTS, NRM, SAT, STEP)**
- **Dynamic servo drive design with extendable motor and gear catalogue**
- **NC-postprocessing** of the curved path for milling, grinding or eroding
- **Automatic diagnostics** of modeling errors
- **Automatic documentation** for models
- Animation, **collision check** with part geometry, single step evaluation, value query
- **Automatic collision check** in displacement plan and simulation
- Masses, springs, dampers, external loads, friction, gravity considered
- Calculation of forces and momentums in all linkages (**Kinetostatic Analysis**)
- Animation with force and momentum vectors
- Animation parts and state-driven parts for easy modeling of complex simulations
- **Durability calculation for cams and rollers** with electronic roller catalogue
- **Parametrics module** for **linkage synthesis** and calculation of mechanisms by **individual calculation forms**
- Parametric simulation models and displacement plans
- Classical methods of linkage synthesis
- **Online-Help** (Windows help file)
- German and English user interface

System requirements: Windows XP / Vista / 7 / 8 / 10

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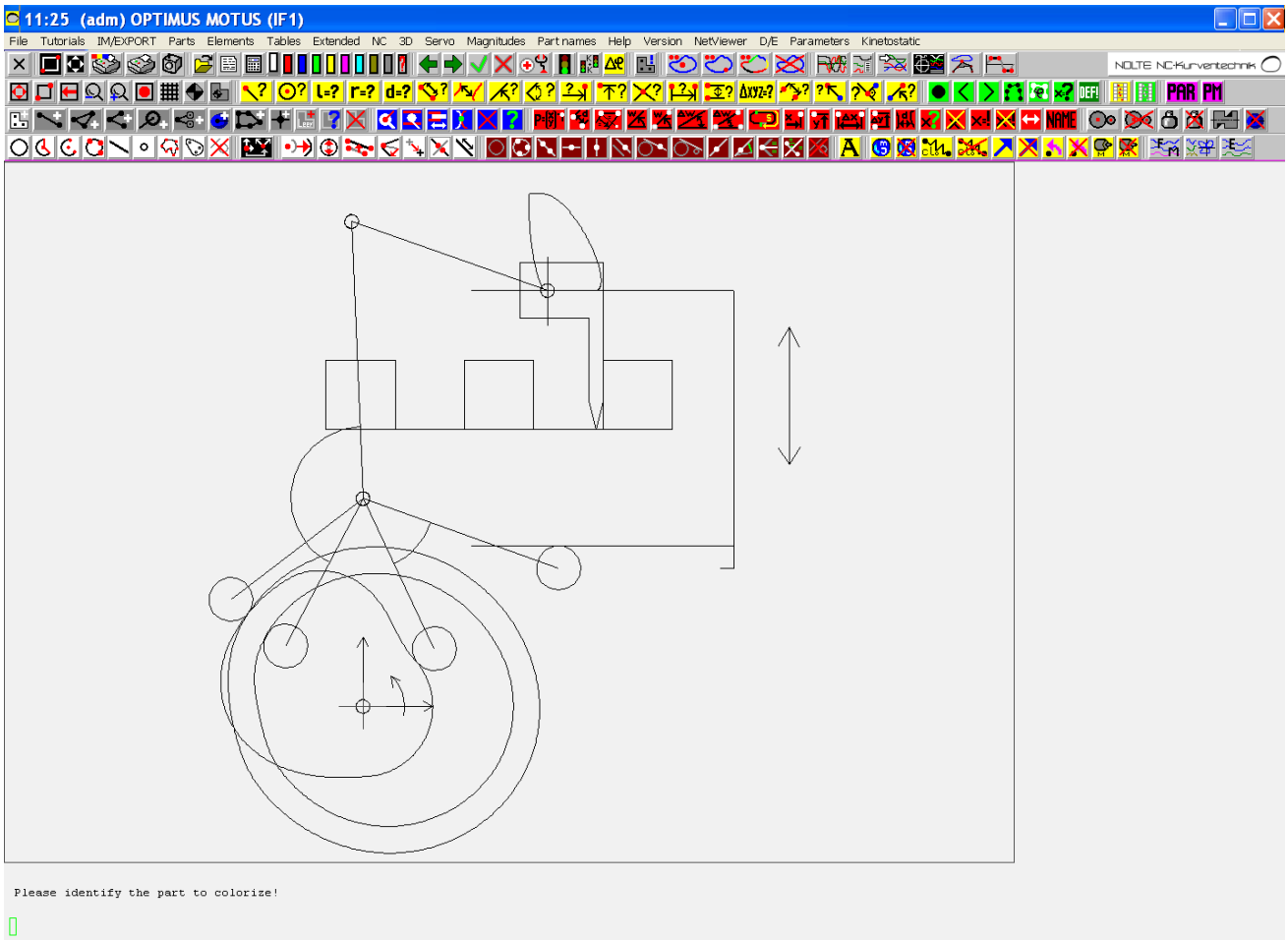
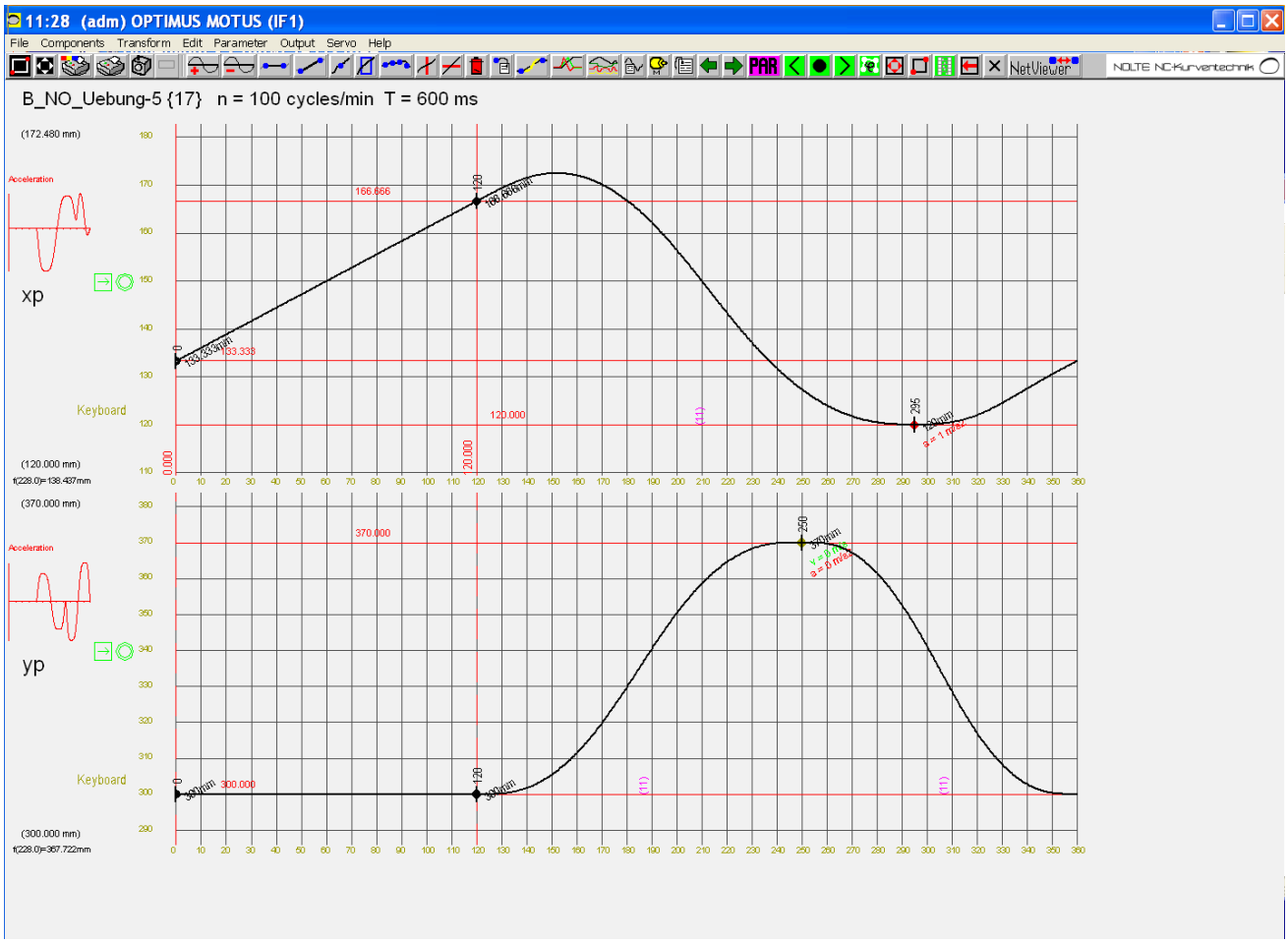
- Suitable for practical application, rich set of functions
- Easy to use CAD-like user interface
- Short training phase
- Independent from CAD-licences
- Compatible to common CAD-systems by standard interfaces (DXF, IGES 2D/3D, MI, VRML, PTS, DAT, NRM, SAT, STEP)
- Cams, linkages and servo controls are combinable



Accelerate your product design considerably by using a modern, practical calculation and simulation tool!

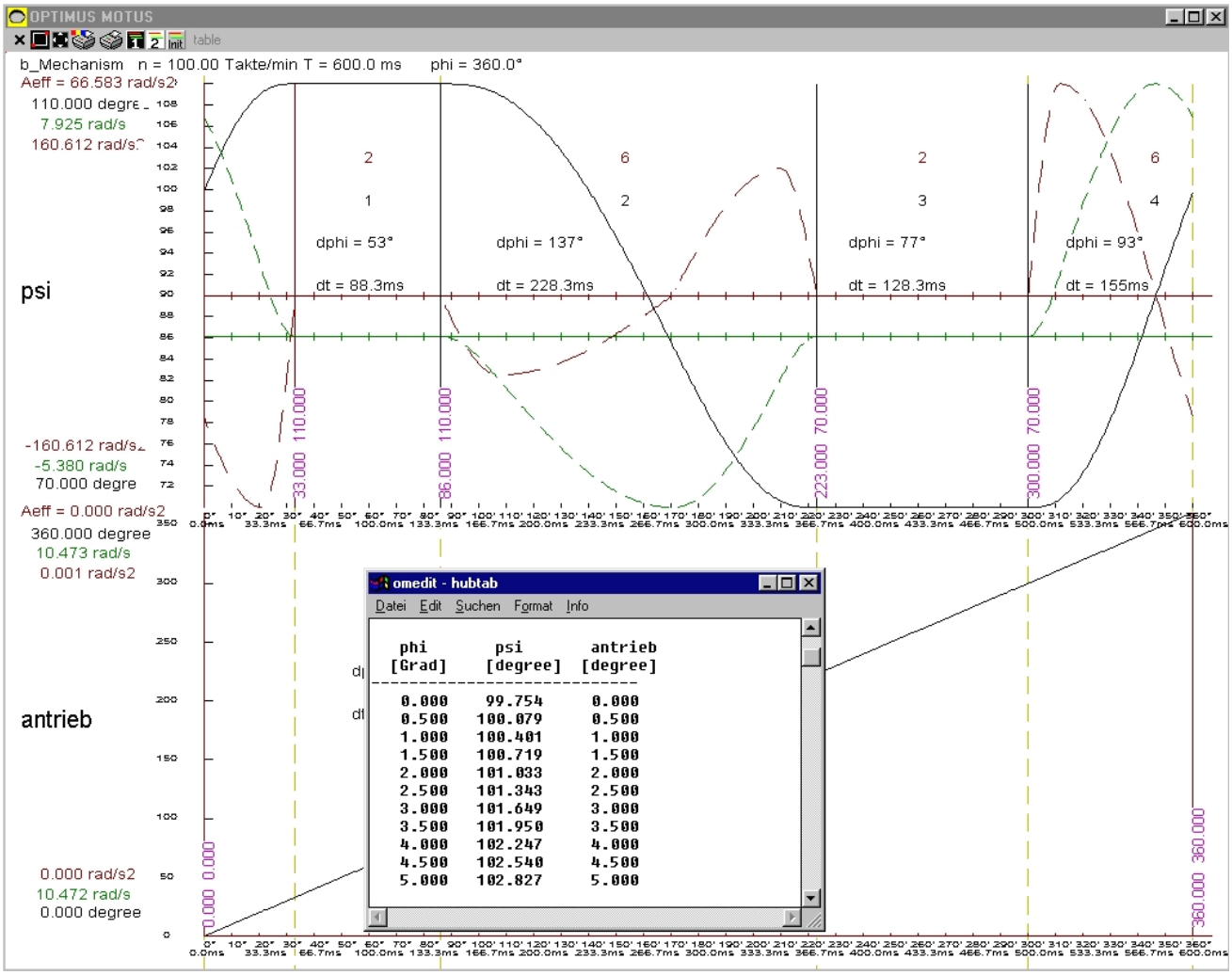
Show your customers in the phases of presale and design how his machine will work!

- Grafic definition and optimization of the whole motion scheme
- Automatic generation of the displacement diagram with harmonic acceleration
- Editor can be used for cams, servo controls, hydraulic or pneumatic devices
- Formulas definable for dependencies between motion courses
- Export of tables for path, velocity, acceleration, jerk in many unit combinations into the windows clipboard
- Management of motion course groups
- Data exchange with ebp standard format
- Automatic import of multi-column tables



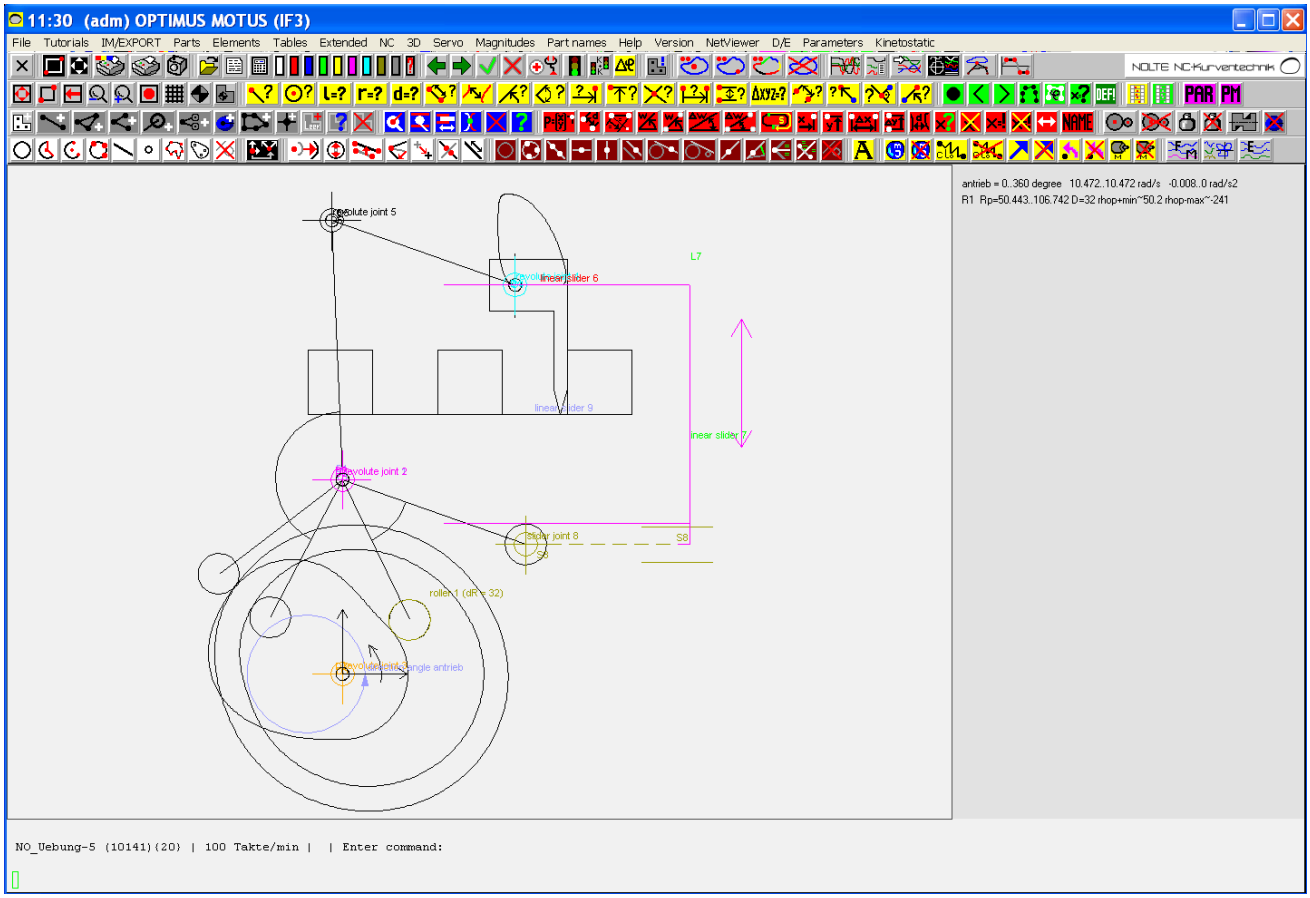
Optimize not only one cam on its own, but all motions of the entire machine at once. This is the largest potential of sleeping performance!

- 62 motion laws: german VDI-directive 2143, higher motion laws, polynomial interpolation, splines, HS-profiles, tables, synchronous operation, user definable formulas
- Point in cycle, lifts, reversal points, boundary values, types of motion laws etc. easy to change by few clicks
- Easy acceleration optimization with dynamic display of peak values and path-time-courses
- Import of external motion descriptions in standard formats
- Numerical optimization of displacement plan parameters



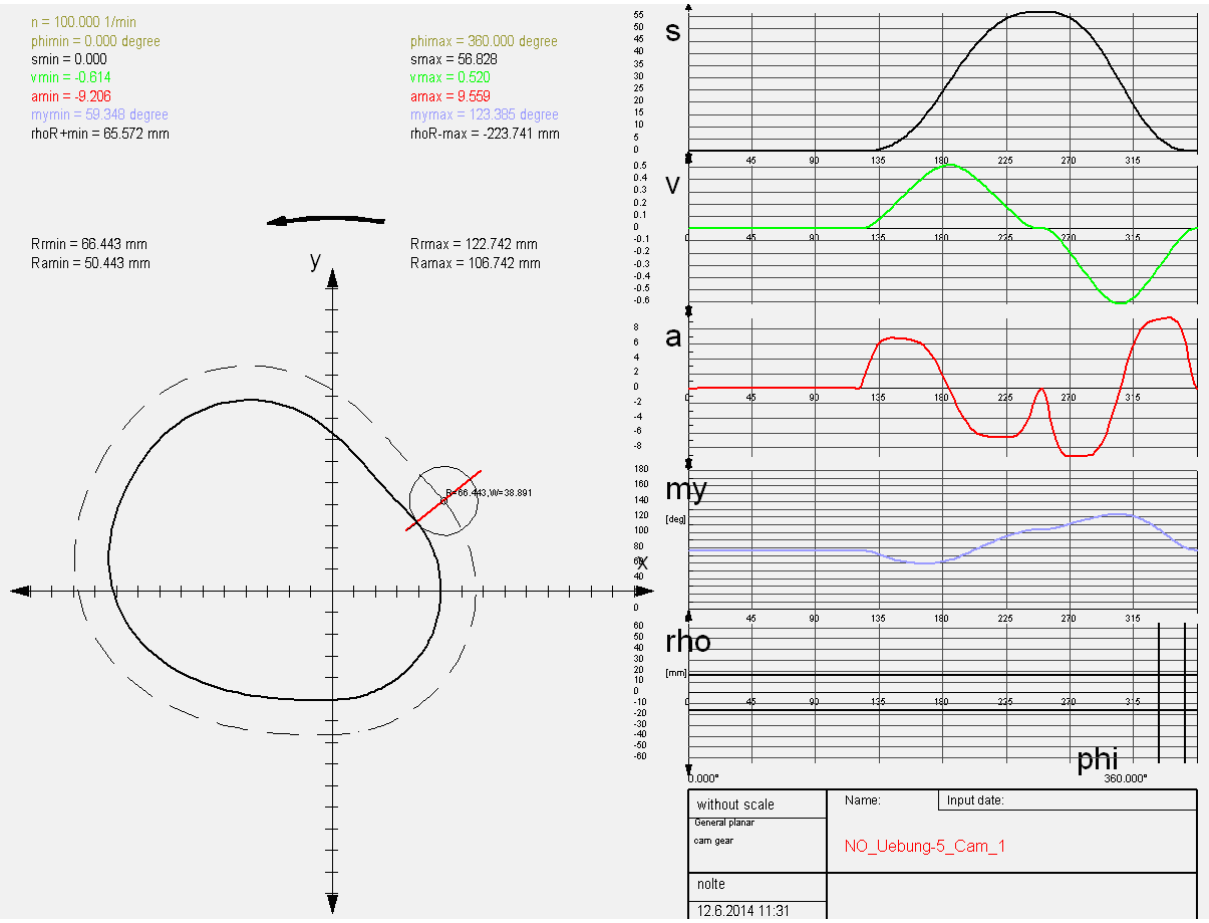
Use the extensive possibilities to describe motions with CAD-OPTIMUS MOTUS ® to get the highest performance and the lowest wear!

- Intuitive modeling of mechanisms with revolute joints, slider joints, linear joints, cam joints, gears, rollers, noncircular gears, spatial coupling rods, chains, belts and user-defined constraints
- Automatic diagnostics of the model of the machine (the computer guesses what is missing)
- Click-by-Click tutorials to simplify the first steps with the software



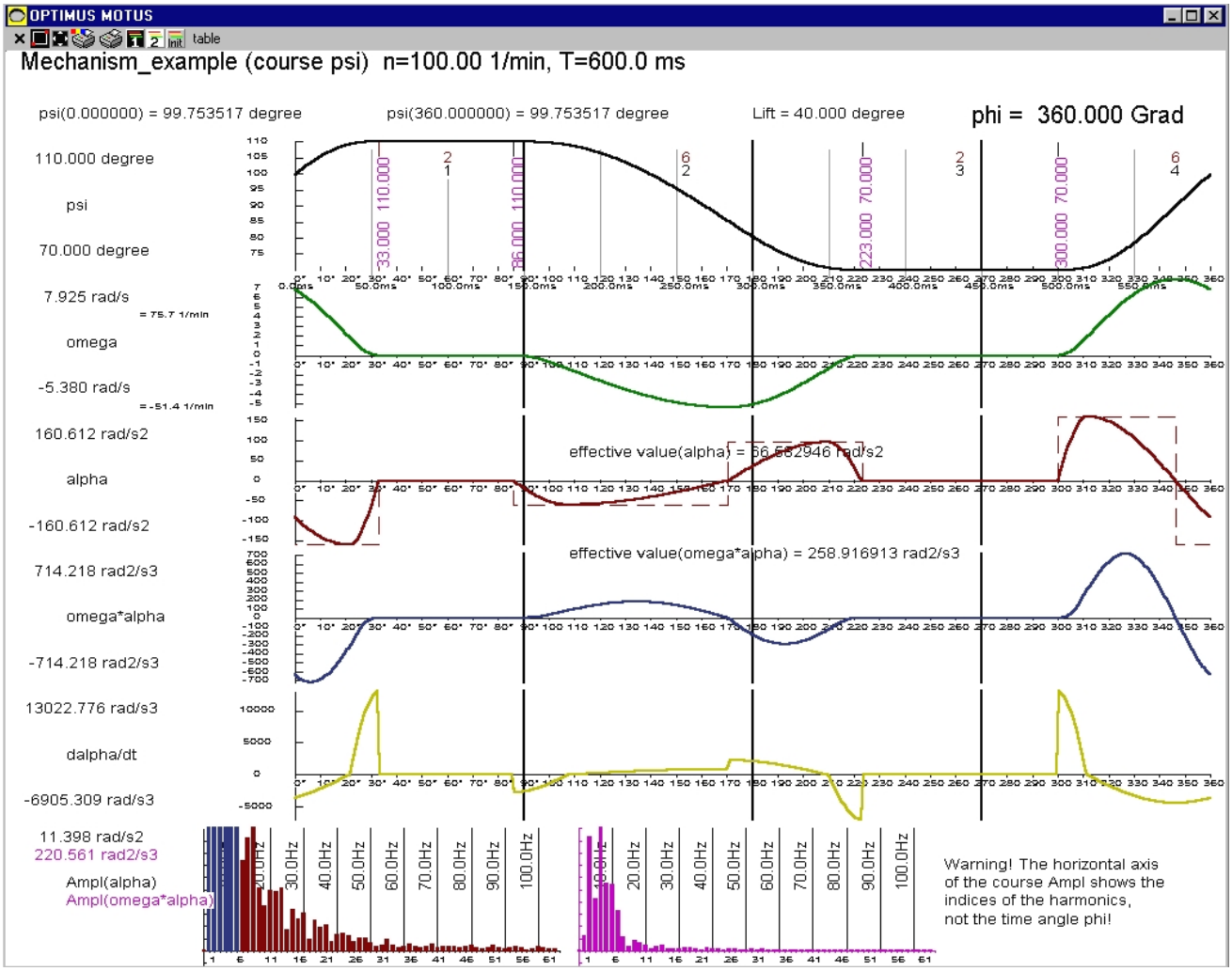
Check and optimize your machine on the screen first and not in real life!

- Detailed evaluation of the planar and cylindrical cams with path, velocity, acceleration, transmission angle and radius of curvature
- Output of lists and diagrams as documentation of the results of the calculation
- Cam and roller durability calculation with an electronic roller catalogue
- Definition of a slack curve for each cam flank possible
- Export of the cam profiles for many CAD systems



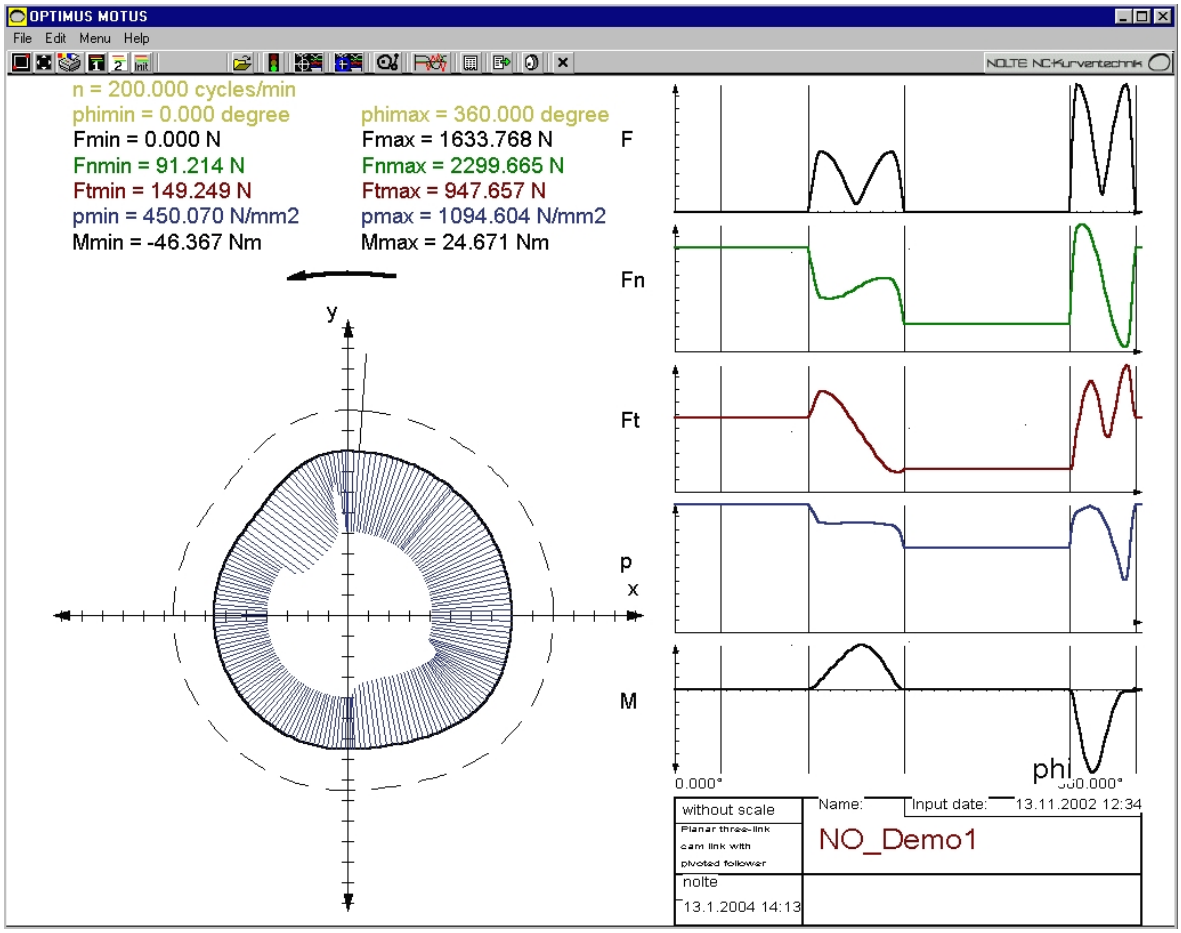
Demonstrate the correctness of your concept by showing explicit diagrams, drawings, lists and animations!

- Detailed evaluation of motions with path, velocity, acceleration, course of momentum, jerk and fourier analysis
- Optimal adjustment of the motion to the task
- Maximum and effective torque values to choose the best motor/gear combination
- Motor and gear catalog with dynamic evaluations and automatic search algorithm, extendable by the user



Optimize the paths of motion with the help of expressive diagrams to deal with following conditions: minimization of vibration, high static loads, high masses, adjustment of internal slack, cutter interference.

- Forces and torques in linkages based on inertia, springs, dampers, gravity, external forces, friction
- user definable spring characteristics with conditions
- Pressure of Hertz in cam joints
- Durability calculation for cams and rollers with an electronic roller catalogue
- Eigenbewegung (self movement), kinematic and potential energy
- Diagram, lists and hodographs of forces (vector plans)
- Diagrams of deceleration and run-up
- Driving torque calculated with power balance
- Calculation of Jred(φ)
- HS-profile optimization
- Vibration simulation with a linear differential equation of 2nd order
- Part load tables as input definition for FEM simulations

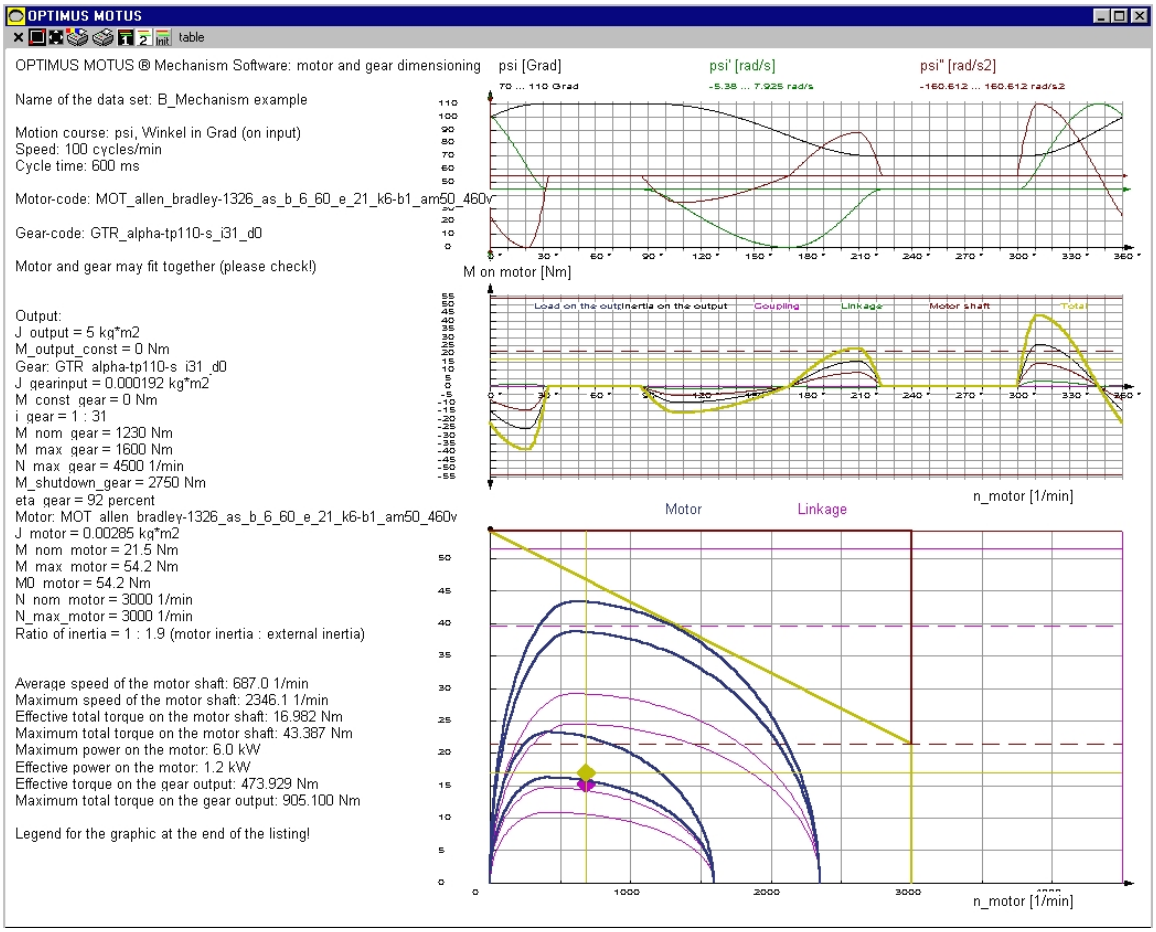


Determine the static and dynamic loads of mechanisms in time of engineering to be sure that the prototype of the machine will have the desired performance!

From a steadily growing catalog of thousands of motors and gears the software automatically selects the best combination of servo motor and gear for a given motion task, based on dynamic criteria.

OPTIMUS MOTUS ® considers:

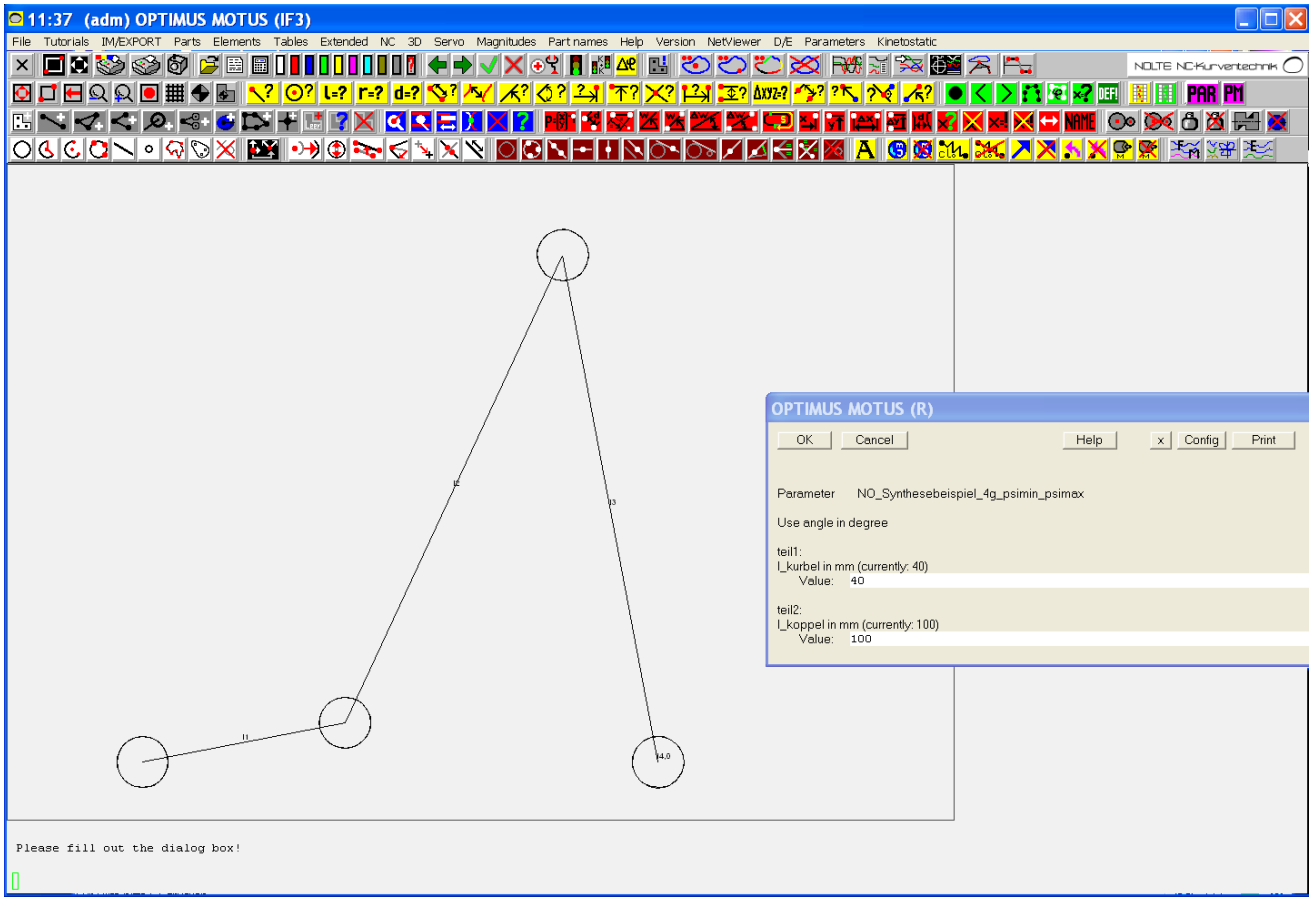
- The exact path-time-course on the output
- Motion and load distortions caused by linkages
- Arbitrary load courses in the mechanism and masses, springs, gravity, friction
- Characteristic speed-torque lines of the motors
- Characteristic lines of the gear efficiency
- Gear shock factors
- Do motor and gear fit together?
- A definable speed reserve



CAD-OPTIMUS MOTUS ® considers the changing ratios of loads on the controller very precisely! Simple concept tools of the producers of servo controllers have to simplify the calculation that for, that there can be done no reliable design.

Parametrics Module

- For the calculation based on forms, which can be prepared individually by us or by the user
- For questions of the following kind: "How long to make the coupler, if the maximum radius of the cam should be 100 mm?"
- For the numeric optimization of kinematic dimensions and displacement plan parameters to get the best mechanism solution for arbitrary design goals
- Simulation model and displacement plan can be described depending on product format parameters to simplify designs of machines for a big product range
- Classical methods of linkage synthesis
- Export of C and IEC1131 source code for parametric displacement plans



Available software modules for CAD-OPTIMUS MOTUS ®:

CAD-OPTIMUS MOTUS ® module 1 (basic module)
- Kinematics with planar cams, cylindrical cams and linkages
- simulation, cam calculation, NC postprocessing, CAD data exchange

Option: CAD-OPTIMUS MOTUS ® module 2 (kinetostatics)
- force and torque calculation for linkages

Option: CAD-OPTIMUS MOTUS ® module 3 (parametrics)
- calculation forms
- numerical mechanism synthesis
- optimization for large format ranges

Option: Servo programming
- Postprozessors to export files for servo controllers of many drive manufacturers (CSV, Structured Text, C, Elau/Schneider Electric, Bosch Rexroth, Siemens, Parker Hannifin, B&R, Lenze, Allen Bradley/Rockwell, SEW, Mayr, Bachmann etc.)

You get the perfect solution for your machine motion business with the software CAD-OPTIMUS MOTUS ® combined with our additional services:

+ Special customization of the software

+ Individual Training on CAD-OPTIMUS MOTUS ®

+ Hotline-Service

+ Update-Service

+ Design and optimization of your specific motion application as service

+ „Mechanism theory and practice“ as trainings

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