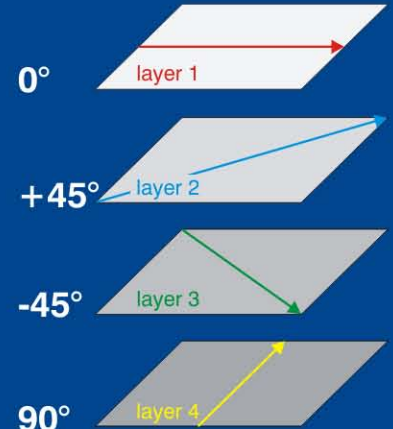
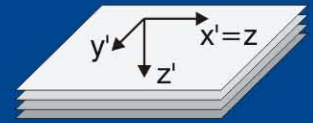


PERMAS

Dynamics with Active Damping

Active damping of lightweight structures:

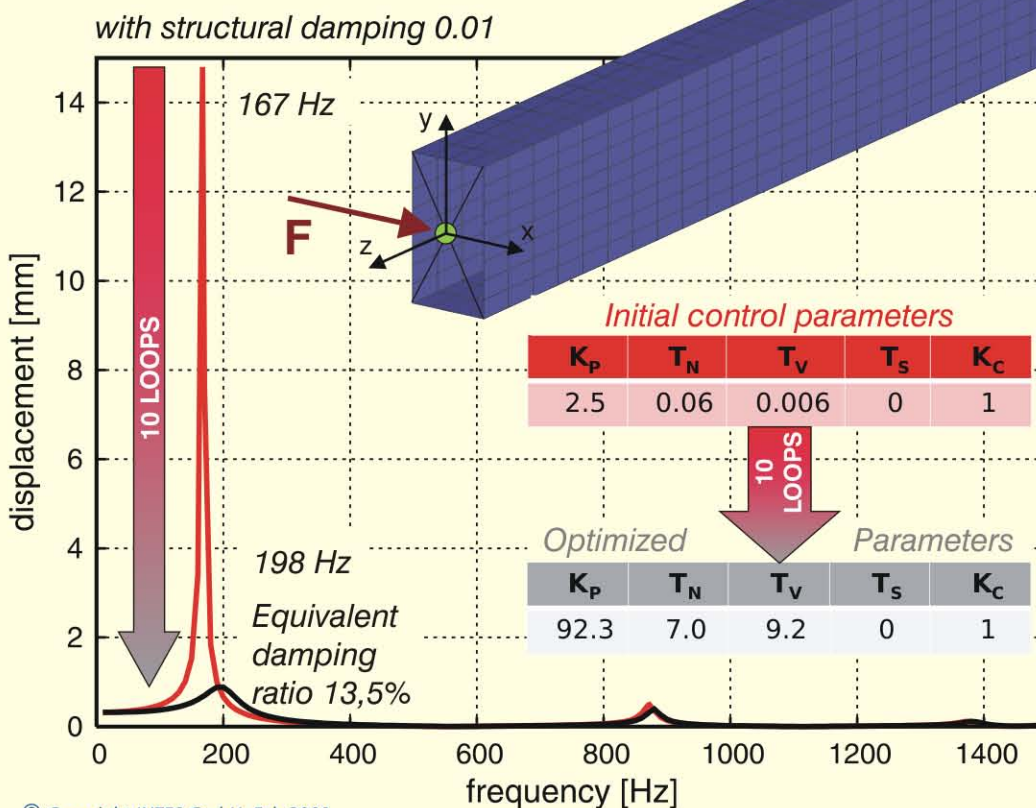
- Control elements in FE model
- Contribution to stiffness and damping
- Modal and direct frequency response with linear controllers
- Frequency response optimization of control parameters and controller position
- Modal and direct time-history response
- Complex eigenvalue analysis to estimate stability
- Nonlinear control elements also available



Symmetric ply stack with 8 plies (only upper half of stack is specified)

Optimization of controlled frequency response of CFRP box girder

Induced actuator force is distributed to element patches by distance weighting.

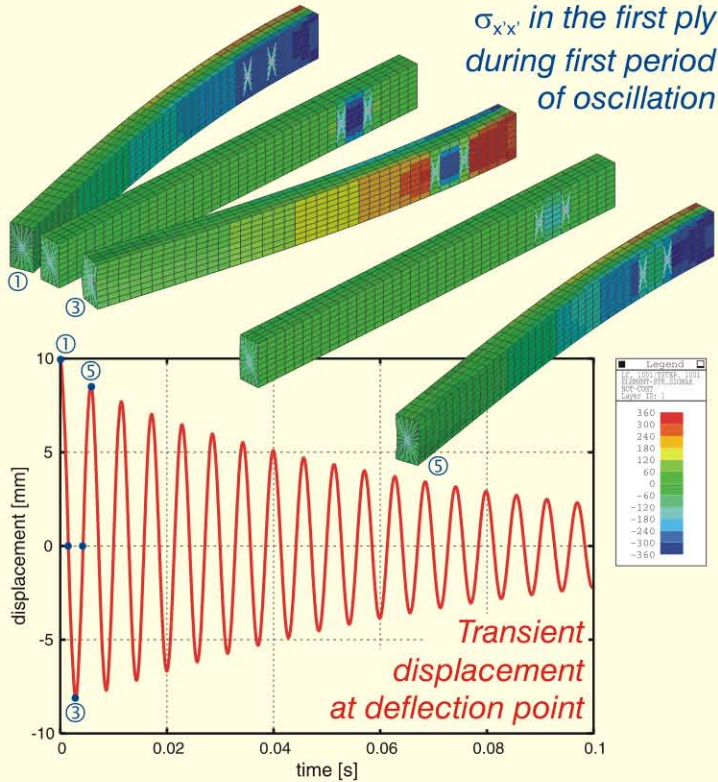


The displacement is measured between P_3 and P_4 and the actuator force is induced between P_1 and P_2 . To simplify control, the positions of P_1 and P_3 as well as P_2 and P_4 are identical.

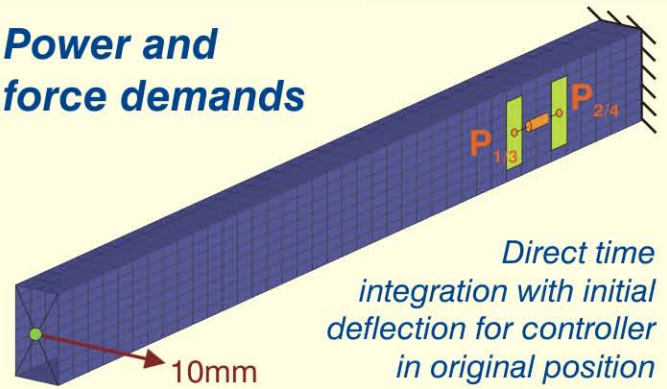
Parameters of Three-Term (PID) controller:

- K_P Amplification (P unit)
- T_N Reset time (I unit)
- T_V Derivative rate time (D unit)
- K_C Scaling factor
- T_S Time delay

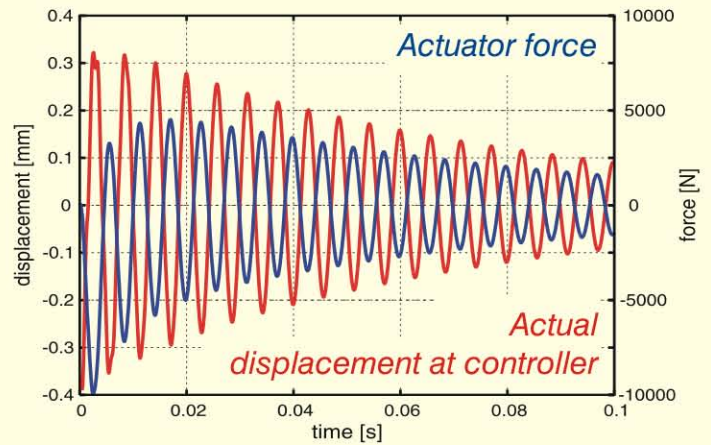
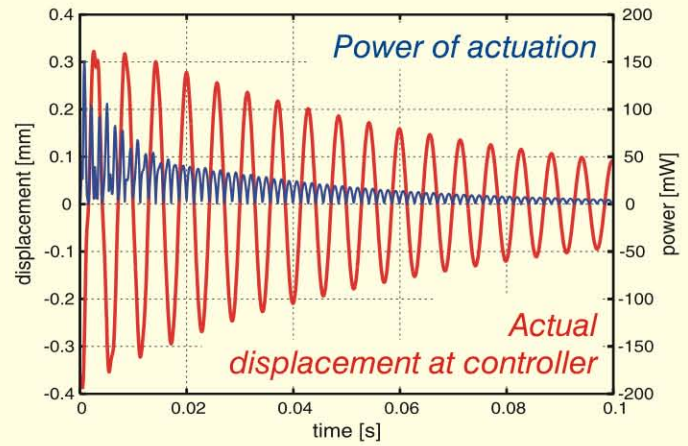
Transient stresses



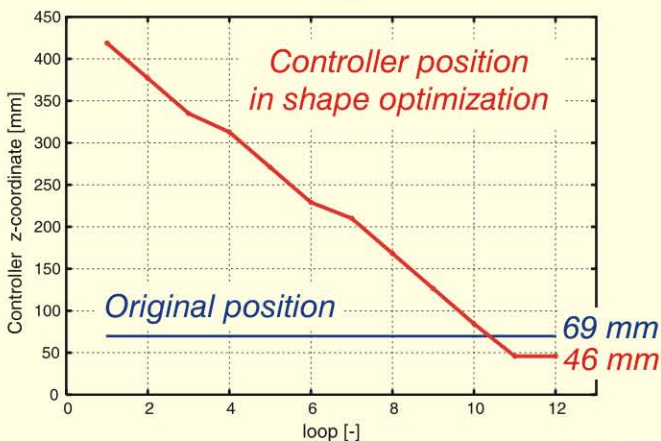
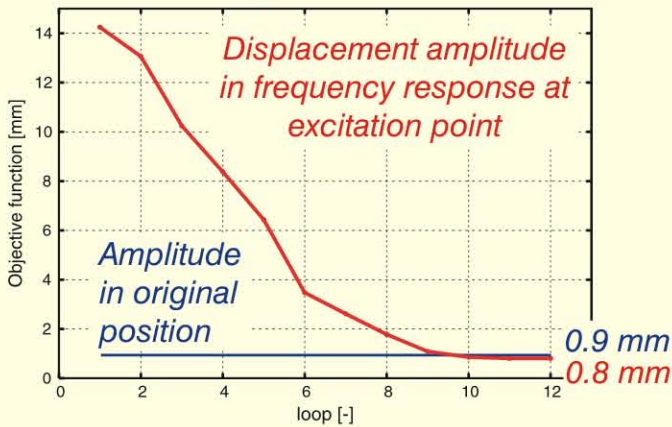
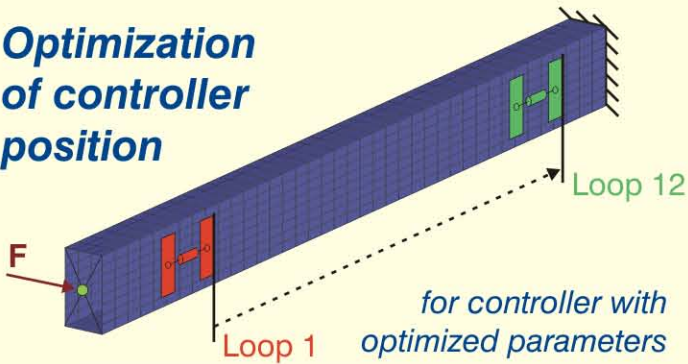
Power and force demands



K_P	T_N	T_V	T_S	K_C
92.3	7.0	9.2	0	1



Optimization of controller position



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