



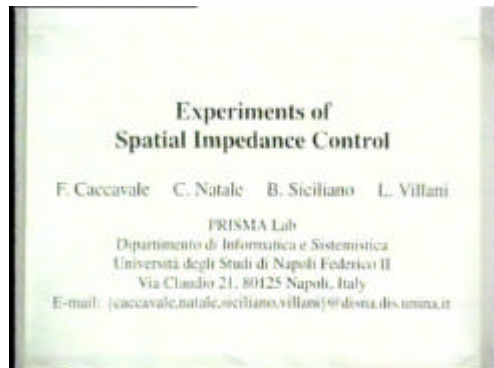
## Experiments

- Set-up
  - COMAU Smart 3-S robot
  - Open control architecture
  - ATI force/torque sensor
- Force-motion control
  - Compliance control
  - Impedance control
  - Force control
  - Parallel control
  - Hybrid control



## Experiments (cont'd)

- Impedance control
  - Contact with unknown surface
  - Accommodation of both force and moment
  - Geometric consistency





## Experiments (cont'd)

- Extension to dual-robot system
  - typical peg-in-hole assembly task
  - robot holding the hole controlled as 6-DOF impedance
  - robot holding the peg programmed in PDL-2
  - accommodation of misalignment and overshoot



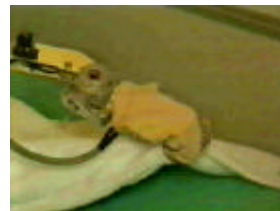
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## Further experiments

- Set-up @ ARTS Lab, SSSA Pisa
  - DEXTER cable-actuated robot arm
- Compliance control
  - tasks of assisting disabled people



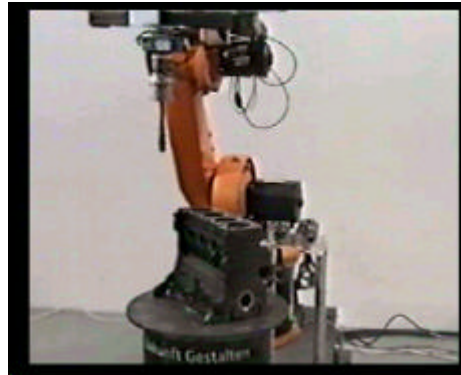
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## Further experiments (cont'd)

- Set-up @ DLR, Germany
  - KUKA robot with force sensor and camera embedded in the gripper
- Integration of vision and force
  - visual feedback in gross motion
  - force feedback in fine motion



## References

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