

Observer-based friction compensation for bilateral teleoperation

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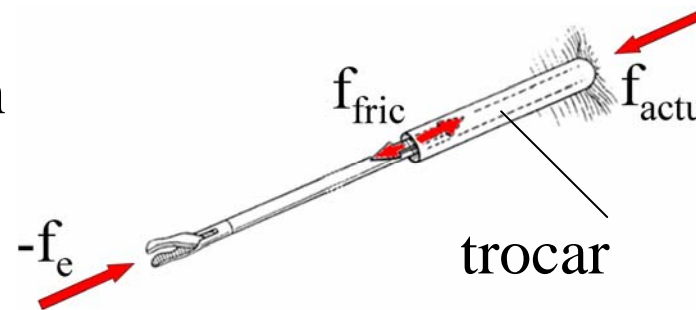
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f_e slave/environment interaction

f_{fric} trocar friction

f_{actu} actuator force



$$\max |f_e(t)| \approx \max |f_{fric}(t)|$$

Time-dependent behavior of f_{fric} : compensation using a **disturbance observer** which is **not** based on a model of the friction!

Structure of the poster

- Observer based on a model of the dynamics of the mechanical system
 - Observer output in the nominal case (no model uncertainties)
 - Impact of model uncertainties on observer output and stability
- Experiment showing significant transparency improvement with the studied compensation scheme