

**Development of Paper Actuators with Conductive Polymer Film  
and Analysis of Actuation Properties**

導電性高分子フィルムからなるペーパーアクチュエータの開発と駆動特性の解析

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In this thesis, I developed a paper actuator using soft conducting polymer electrodes. The paper actuator was fabricated by sandwiching a polyelectrolyte layer between two films of poly(3,4-ethylenedioxythiophene) doped with poly(4-styrenesulfonate) (PEDOT/PSS). Additionally, I evaluated the actuation displacement and stability of the paper actuators. Furthermore, to improve the actuation stability of the paper actuator, we developed a fiber-stiffened paper actuator.

In this thesis, my study was described in six chapters:

- Chapter 1: Introduction of the background of this study.
- Chapter 2: Fabrication of paper actuators using two PEDOT/PSS electrodes.
- Chapter 3: Evaluation of the actuation properties for fabricated paper actuators.
- Chapter 4: Development of the fiber-stiffened paper actuators with the PEDOT/PSS electrode films. Evaluation of the actuation cycling stability and displacement of the paper actuators.
- Chapter 5: Fabrication of polyethylene(PE)-covered paper actuator. Effect of the suppression of the water evaporation by PE covering on the actuation displacement.
- Chapter 6: Thesis conclusions.