

# Robust and Optimal Sensor Fusion

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**Abstract**—Abstract text to be done

**Index Terms**—Complementary Filters, Sensor Fusion, H-  
 Infinity Synthesis

## I. INTRODUCTION

## II. OPTIMAL SUPER SENSOR NOISE: $\mathcal{H}_2$ SYNTHESIS

### A. Sensor Fusion Architecture

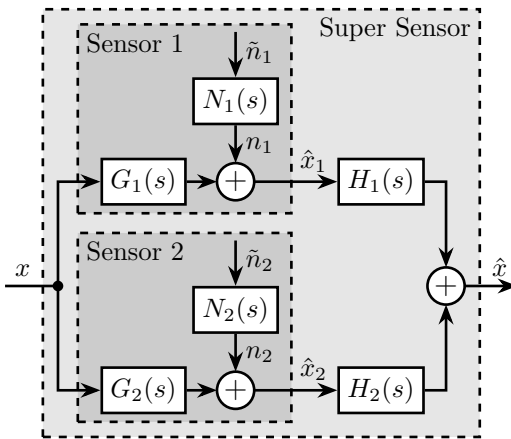


Fig. 1. Figure caption

### B. Super Sensor Noise

### C. $\mathcal{H}_2$ Synthesis of Complementary Filters

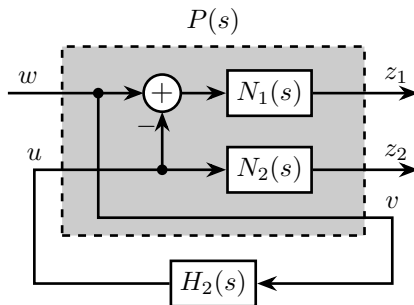


Fig. 2. Figure caption

### D. Example

### E. Robustness Problem

## III. ROBUST SENSOR FUSION: $\mathcal{H}_\infty$ SYNTHESIS

### A. Representation of Sensor Dynamical Uncertainty

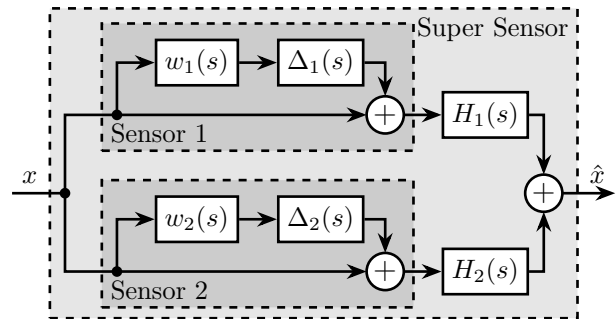


Fig. 3. Figure caption

### B. Super Sensor Dynamical Uncertainty

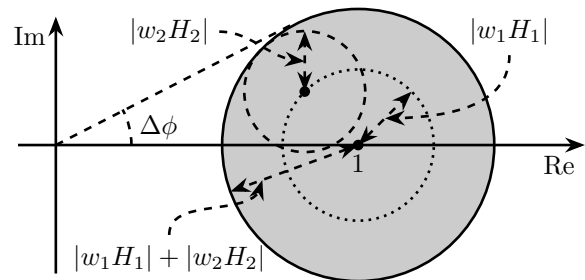


Fig. 4. Figure caption

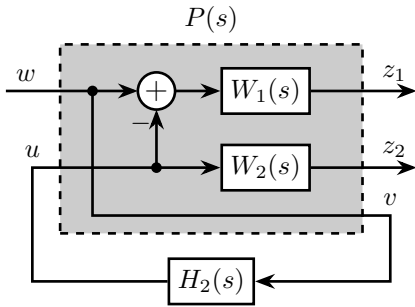


Fig. 5. Figure caption

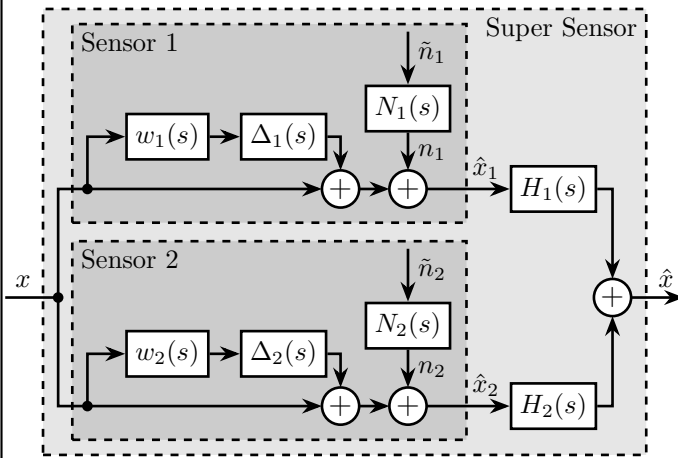


Fig. 6. Figure caption

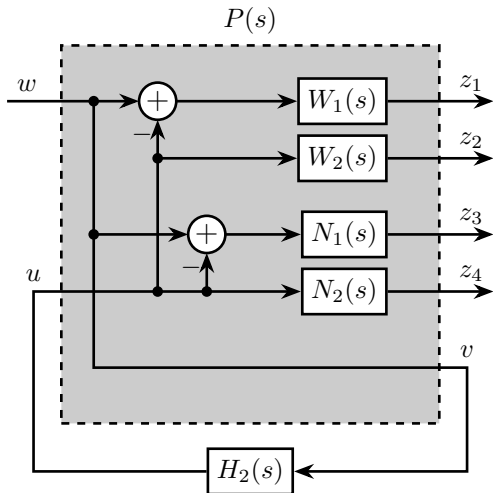


Fig. 7. Figure caption

### C. $\mathcal{H}_\infty$ Synthesis of Complementary Filters

### D. Example

## IV. OPTIMAL AND ROBUST SENSOR FUSION: MIXED $\mathcal{H}_2/\mathcal{H}_\infty$ SYNTHESIS

### A. Sensor Fusion Architecture

### B. Synthesis Objective

### C. Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Synthesis

### D. Example

## V. EXPERIMENTAL VALIDATION

### A. Experimental Setup

### B. Sensor Noise and Dynamical Uncertainty

### C. Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Synthesis

### D. Super Sensor Noise and Dynamical Uncertainty

## VI. CONCLUSION

## VII. ACKNOWLEDGMENT

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