

Design Issues and Tradeoffs of Electronic Interfaces of MEMS Sensors
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MEMS-based sensors are rapidly gaining more acceptance and penetrating more markets, and a good electronic interface is usually necessary to extract useful information from such sensors. A high performance electronic interface is essential to realize the full performance and miniaturization potential of MEMS devices. This presentation discusses some of the challenges and tradeoffs that need to be carefully considered early in the design process.

Inertial sensors constitute a major category of MEMS devices. In order to design a high performance MEMS inertial sensor, the electronics designer needs to adequately select the architecture of the capacitance to voltage converter and carefully consider the interaction with the actuation signal. Partitioning of the system between the analog and digital domain presents several tradeoffs. The design of the ADC converter is a major part of the electronic circuitry and a proper understanding of the tradeoffs of the different ADC architectures is essential. The design issues mentioned above are briefly discussed in this presentation through an example of an electronics interface to a high-end inertial sensor.

Another important category of MEMS devices is optical MEMS. This domain has many common aspects with other MEMS-based systems, but also presents some unique challenges, which will also be outlined in this presentation through an example of an electronics system for a MEMS-based FTIR spectrometer.

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