

# Nine-Axis Sensor Fusion Using the Direction Cosine Matrix Algorithm on the MSP430F5xx Family

Erik Anders, Gabriel Torres, Sushanth Ravindran

## ABSTRACT

This application report explains the implementation of an Attitude and Heading Reference System (AHRS), using the ultra-low-power MSP430F5xx microcontroller, a magnetometer, a gyroscope, and an accelerometer on all three axes. The combination of the sensors is key to the accuracy of the algorithm. Therefore, the sensors' output must be calibrated before being input to the Direction Cosine Matrix (DCM) algorithm. The algorithm is applied to the calibrated sensor readings to calculate the Euler angles describing the orientation of a body, consisting of the yaw, roll, and pitch angles.

Project collateral and source code discussed in this application report can be downloaded from the following URL: <http://www.ti.com/MS430AHRS>.

This application report uses the MPLAB® IDE Microchip™ Windows Developer Kit from Microchip (<http://www.microchip.com/dk>).

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# Nine Axis Sensor Fusion Using Direction Cosine Matrix

**Jin-Ying Zhang**



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## Whispering the Strategies of Language: An Mental Quest through **Nine Axis Sensor Fusion Using Direction Cosine Matrix**

In a digitally-driven earth wherever screens reign supreme and immediate conversation drowns out the subtleties of language, the profound secrets and emotional nuances concealed within words usually get unheard. However, set within the pages of **Nine Axis Sensor Fusion Using Direction Cosine Matrix** a fascinating literary value pulsing with raw feelings, lies an extraordinary quest waiting to be undertaken. Written by an experienced wordsmith, that wonderful opus attracts viewers on an introspective journey, gently unraveling the veiled truths and profound influence resonating within the cloth of each word. Within the psychological depths of the poignant review, we shall embark upon a heartfelt exploration of the book is key subjects, dissect their fascinating writing fashion, and succumb to the powerful resonance it evokes heavy within the recesses of readers hearts.

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