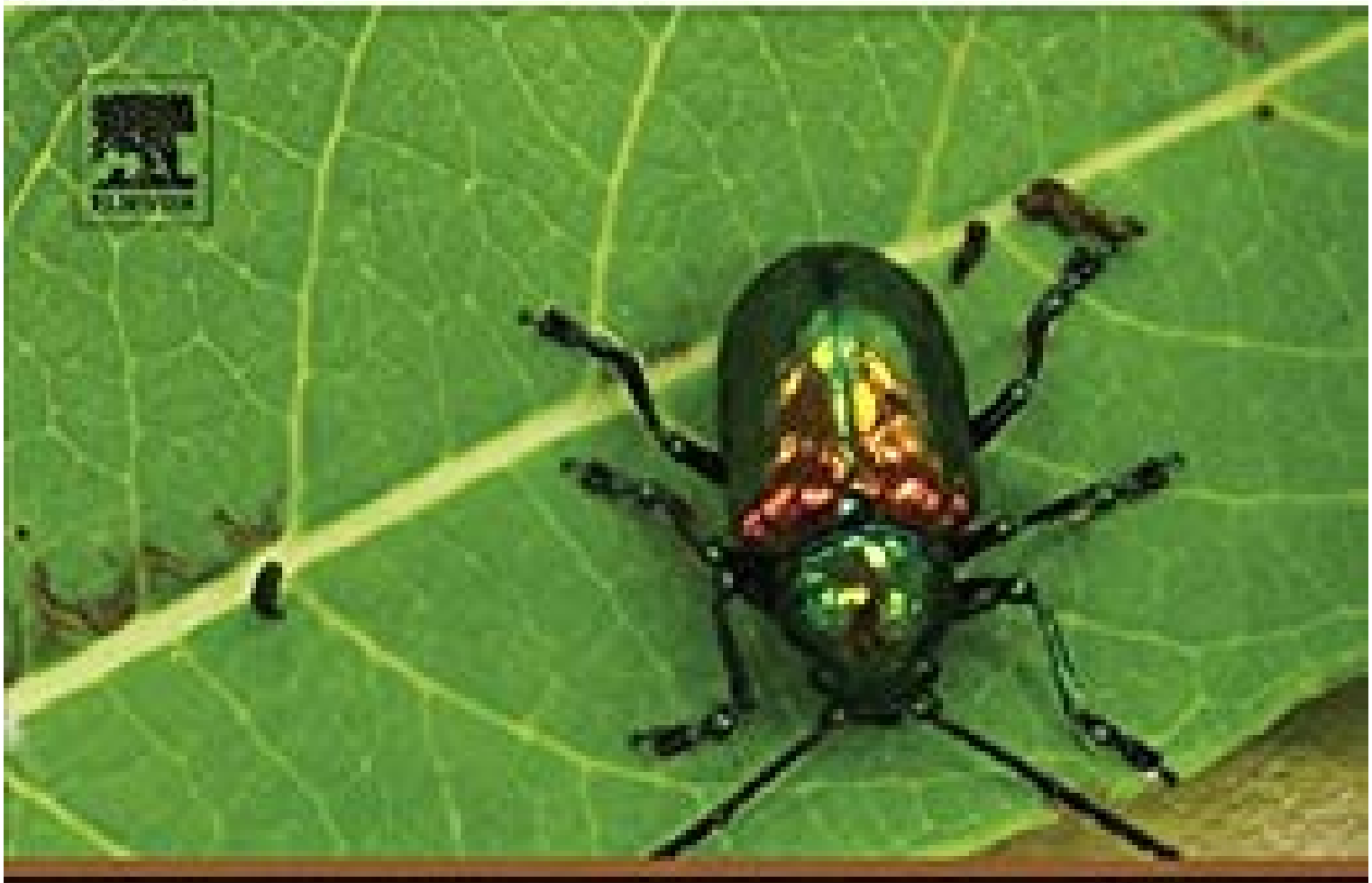
Chapter 9. Flight Control Using Biomimetic Optical Sensors



Engineered Biomimicry

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Insects are reliant on the spatial, spectral, and temporal distributions of light in the surroundings for flight control and navigation. Optical-flow methods for maintaining a constant height above surface and a constant course have been demonstrated to provide navigational capabilities that are impossible using standard avionics sensors. This chapter reviews on trip trials of implementations of insect-motivated behaviors on unmanned aerial vehicles. Precision control of elevation above ground and surface course were achieved over long distances. Both of these sensors were tested over long trajectories in various directions, in each case showing efficiency similar to low-price inertial heading and attitude systems. Various other demonstrated vision-based techniques include a biomimetic stabilization sensor that uses the ultraviolet and green bands of the spectrum and a sky polarization compass.