CS 348B - Computer Graphics: Marc Levoy
Image Synthesis Techniques   Winter, 1992
Stanford University   Handout #28

Homework assignment #2

Due Thursday, February 20

1. Digital compositing

Industrial Light and Magic, the special effects group at Lucasfilm, wishes to use plastic models, an optical scanner, and digital compositing to construct sequences showing X-wing fighters flying against the backdrop of a Death Star. Their procedure consists of scanning each plastic model against a black background and, without moving the camera or model, against a white background, producing images B and W respectively. This process is repeated for each model and for each frame in the sequence. Assume a grayscale scanner (as opposed to color), and assume that all backgrounds are perfectly homogeneous.

(a)   Derive equations for converting images B and W into intensity image I and coverage image α as required for digital compositing. Your α image should contain values between 0 and 1 in pixels lying on the silhouette of the X-wing fighter.
        (7 points)

(b)   Suppose that deliberately uneven illumination of the X-wing fighter resulted in spatially inhomogeneous backgrounds. How might you solve this difficulty? Hint: don't limit yourself to images B and W.
        (3 points)

[...other problems...]