NUMERICAL ANALYSIS OF THE RADIOSITY EQUATION USING THE
COLLOCATION METHOD

KENDALL ATKINSON¹, DAVID DA-KWUN CHIEN², AND JAEHOON SEOL³

Abstract. The collocation method for solving the occluded radiosity equation is examined, theoretically and
empirically. Theoretical results are examined, including questions of superconvergence of the collocation solution.
The use of “discontinuity meshing” is examined for both piecewise constant and piecewise linear collocation. Also,
numerical integration of the collocation integrals is examined, and a near-analytic evaluation method is given.

Key words. radiosity equation, integral equation, numerical integration, collocation methods, discontinuity
meshing.

AMS subject classifications. 65R20.

¹Dept. of Computer Science and Dept. of Mathematics, University of Iowa, Iowa City, IA 52242
²Dept of Mathematics, California State University - San Marcos, San Marcos, CA 92096
³Program in Applied Mathematical & Computational Sciences, University of Iowa, Iowa City, IA 52242