

Closed-Form Approximations to the Volume Rendering Integral with Gaussian Transfer Functions

Joe Kniss Simon Premože Milan Ikits
Aaron Lefohn Charles Hansen

UUCS-03-013

School of Computing
University of Utah
Salt Lake City, UT 84112 USA

July 25, 2003

Abstract

In direct volume rendering, transfer functions map data points to optical properties such as color and opacity. We have found transfer functions based on the Gaussian primitive to be particularly useful for multivariate volumes, because they are simple and rely on a limited number of free parameters. We show how this class of transfer function primitives can be analytically integrated over a line segment under the assumption that data values vary linearly between two sampled points. Analytically integrated segment can then be composited using standard techniques.