

ABSTRACT

**A NEW ILLUMINATION MODEL
IN COMPUTER GRAPHICS**

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It is needed to model that describes the interactions between light and surface in computer graphics and computer vision. Bidirectional Reflectance Distribution Functions (BRDFs) have been used for this purpose.

In this thesis project; first, Bidirectional Reflectance Distribution Function (BRDF) term has been handled, then most popular analytical BRDF models have been investigated. After that, parameters estimations of these models have been investigated. In this thesis; a new BRDF model has been proposed. All of the parameteres of this new BRDF model are linear and they are represented in principal components. This model is for both diffuse and glossy materials. The new BRDF model has been compared with most popular analytical BRDF models on different measured BRDF data sets.

A new method has also been proposed for estimation of parameters of the new BRDF model. This method eliminates noise which has been in measured BRDF data. This method is an iterative method and gives weights to each BRDF data to represent it in most suitable way.

Keywords: BRDF, analytical BRDF model, linear BRDF model, principal components.