

Title: Atmospheric Rendering

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Abstract: The sky is an important feature of all outdoor scenes. This thesis explores the topic of skydome models — an approach to getting the sky and atmospheric effects integrated into a renderer. We discuss the physics of atmospheric scattering and describe in detail the construction of a first-principles path tracer atmospheric simulator implementation. The presented path tracer is fully spectral and produces polarization data. Finally, we present two different analytic skydome models. These analytic models are highly practical because they can be integrated even into real-time renderers and provide an excellent combination of fidelity and low computational cost. The first model is a simpler version, providing just the skydome spectral radiance. The second model also provides polarization data, after-sunset skies with an accurate modeling of Earth's shadow, aerial perspective and full sphere data.

Keywords: computer graphics, rendering, skylight models, atmospheric modeling