Simulating the Effect of Atmospheric Distribution on a Wave Front

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When light travels through the atmosphere, their wave function becomes distorted. This distortion is what causes the stars to twinkle and our telescopic images to have low resolution. So how much does the atmosphere affect an incoming wave front? This can be answered by calculating the Strehl of an aberrated (distorted) wave function. Strehl is the ratio of the intensity heights of the aberrated wave function over the unaberrated wave function (a perfect system). The closer the ratio is to one, the better the resolution of the image will be. Using the program Mathematica, I have been able to simulate a perfect wave front and an aberrated wave front similar to what the atmosphere would create, and calculate the Strehl ratio from them. Results from a simulation give a Strehl of 0.03, which would correspondingly result in a blurry image. This shows the need for an adaptive optic system to correct the distortions in the wave front, which would yield a better Strehl ratio, and therefore result in a better image.