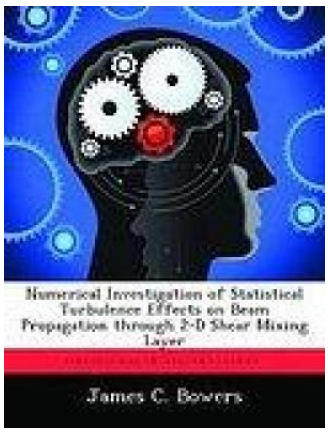


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# Numerical Investigation of Statistical Turbulence Effects on Beam Propagation through 2-D Shear Mixing Layer

By James C. Bowers

Bibliioscholar Nov 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x6 mm. This item is printed on demand - Print on Demand Neuware - A methodology is developed for determining the validity of making a statistical turbulent approach using Kolmogorov theory to an aero-optical turbulent flow. Kolmogorov theory provides a stochastic method that has a greatly simplified and robust method for calculating atmospheric turbulence effects on optical beam propagation, which could simplify similar approaches to chaotic aero-optical flows. A 2-D laminar Navier-Stokes CFD Solver (AVUS) is run over a splitter plate type geometry to create an aero-optical like shear mixing layer turbulence field. A Matlab algorithm is developed to import the flow data and calculates the structure functions, structure constant, and Fried Parameter (ro) and compares them to expected Kolmogorov distributions assuming an r 2/3 power law. The range of Cn 2's developed from the structure functions are not constant with separation distance, and ranged between 10-12-10-10. There is a consistent range of data overlap within the Cn 2's derived from various methods for separation distances within the range 0.01m-0.02m. Within this range ro is found to be approximately 0.05m which is a reasonable value. This particular 2-D shear mixing layer was...

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