Applied Mathematics and Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, 13 October 2010, 4:00 p.m.

Kershaw Closures to Moment Equations

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Abstract.

We will study Kershaw closures to moment equations in the setting of transport equations. First we introduce moment models in this context and subsequently derive a way to construct necessary closures. In the one-dimensional case realization conditions of general moment problems can be explicitly expressed and hence moments are uniquely determined on the boundary of the admissible domain. The idea is to define the highest order moment by an interpolation of the lower order moments on the analytically given boundary (hyper-)surfaces and the equilibrium state. Thus we derive closures which are exact in the limit to both the free streaming regime and the equilibrium state. We present a way to construct closures of arbitrary order, which are rational functions, derive the first members of this hierarchy and investigate into some of their properties. Finally, numerical simulations comparing different closures are presented.