非线性优化方法在大气和海洋科学数值研究中的若干应用

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摘要： 控制大气和海洋运动的模式是复杂的非线性模式，在考虑到线性奇异向量和线性奇异值只能描述切线性模式有效时段内小扰动发展的情况下，介绍了作者们近年来用非线性优化方法数值研究大气和海洋科学的有关工作，其中包括非线性奇异向量和非线性奇异值、条件非线性最优扰动、以及它们在数值天气和气候可预报性研究中的应用．结果表明，上述非线性优化方法在很大程度上揭示了大气和海洋运动的非线性特征；此外，对可预报性问题的新分类也做了详细介绍，即最大可预报时间、最大预报误差和最大允许初始误差 A·D2 这种分类的应用背景是针对数值天气预报和气候预测产品的评价；最后，讨论了数值模式敏感性分析的非线性优化方法，该方法在一定条件下可以定量识别模式误差和初始误差，量化判断数值模式的模拟能力．

关键词： 非线性优化；天气；气候；可预报性；敏感性分析
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