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流固耦合数值模拟方法及其在分段式SRM的应用(PDF)

Title: Fluid Structure Interaction Method and Its Application in SRM with Segments

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摘要： 固体火箭发动机工作过程由于结构变形与内流场之间的流固耦合作用可能造成发动机内流场压强振荡，导致载荷的动态受力甚至可能毁坏载荷。从耦合算法、界面数据传递、动网格算法三个方面介绍了流固耦合数值计算方法，总结了流固耦合在分段式固体火箭发动机工作过程压强振荡方面的研究及应用进展。指出基于分离解法，结合流场大涡模拟模型，能较好的求解固体发动机内因流固耦合因素导致的压强振荡问题。

Abstract: The fluid structure interaction between the propellant and the internal flow field will cause oscillation in the solid rocket motor during operation. The oscillation of structure will influence the internal blast pressure and thrust, which will bring the dynamic press on the payload and even cause payload destroy. The fluid structure interaction method was introduced with the aspect of couple method, interface data transferring and dynamic mesh method. The fluid structure interaction numerical method and the application of pressure oscillation were summarized and analyzed. Based the partitioned method, coupled the structure codes and the fluid codes including the large eddy simulation model can solve the fluid structure interaction problem properly.

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