

Review of Factors Which Affect Throttling by Oxidiser Flow Control in Hybrid Rocket Engine

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Abstract : The throttling process in hybrid rocket engines (HREs) poses challenges due to inherent instability, impacting the engine's reliability and robustness. Identifying and advancing existing technology is crucial to meet the demands of complex mission profiles required for next-generation launch vehicles. This paper reviews the current literature, focusing on oxidiser flow control for throttling purposes in HREs. Covered areas include oxidiser choices, commonly used throttle valves, and literature trends. Common oxidisers for throttling are hydrogen peroxide, nitrous oxide, and liquid oxygen. Two frequently chosen valves for throttling are the ball and variation pintle valves. The review identifies two primary research focuses: flow control valve studies and control system design. The current research stage is highlighted, and suggestions for future directions are proposed to advance thrust control systems in HREs. This includes further studies in existing research focuses and exploring new approaches such as system scheme design, numerical modelling, and applications.

Keywords : hybrid rocket engines, oxidiser flow control, thrust control, throttle valve, review

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