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### Guidance and control of aerospace vehicle utilizing solar sail technology

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In this paper, we present guidance and control of aerospace vehicle which is one of the most important applications for satellite and space missions utilizing solar sail technology which offer new capabilities for the analysis and design of space missions. Uses of sunlight generate propulsions in space vehicle by reflecting solar radiation pressure from a large, mirror-like sail made of lightweight, highly reflective polyimide film material. The importance of the control system for the space vehicle is to keep it in the right path with respect to attitudes and abrupt changes during its orbital trajectory. Static margin is essential to achieve the control which is the relative shift between center of pressure and center of mass depend on space vehicle design. We achieve static margin by control the movement of individual sails and movement of control mass . The force and sail temperature affecting on the space vehicle are changing along orbital trajectory with respect to solar distance and sail angle. So , The control system must compensate for all of these changes for it to hold the desired attitude .Where we use numerical integration by applying pure pursuit guidance method on our model to proof equations of motion for our model .Pure pursuit guidance method is known as path planning algorithm also the pure pursuit guidance method was stretched well beyond its intended usage by many aerospace applications. The pure pursuit algorithm is used to accomplish goal-seeking and path tracking. To guide and control Aerospace vehicle motion.



Fig. 1. Schematic geometry of the Earth-Moon restricted three-body problem.

#### **Biography**

Ahmed R El- Sawi completed his Bachelor degree in Electrical Engineering at Military Technical College, Cairo, Egypt, in 2007. He published many international papers and participates in national and international conferences. His area of research interest is Guidance, Control and Navigation techniques for Aerospace systems.

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