

Mathematics Awareness Month

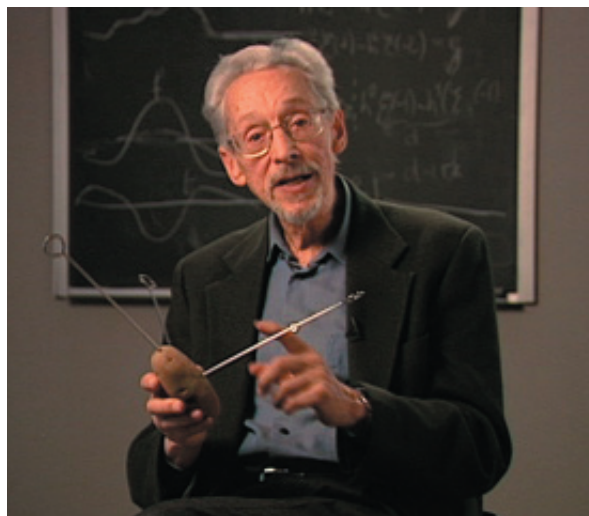
Mathematics and the Cosmos, April 2005

The Right Spin with Astronaut Michael Foale Narrated by Robert Osserman

Michael Foale was the American astronaut on board the Russian space station Mir in 1977, when an unmanned Progress supply ship failed its docking attempt. With the station tumbling uncontrollably and unable to generate power from its solar panels, the lives of the astronauts were in grave peril. Michael Foale proposed using the thrusters on an attached Soyuz vehicle that served as an emergency evacuation “life boat” to stabilize the Mir. The problem was how to use those thrusters to transform the tumbling motion into a regular spin about an axis that would keep the undamaged solar panel facing in the direction of the sun and thus restore electricity to the station.

In this DVD, Michael Foale provides his personal account of the experience, and explains the mathematics involved in rescuing Mir from what would have been its certain demise.

Bob Osserman, who chaired the advisory committee for the April 2005 Math Awareness Month, and who has a distinguished record of bringing mathematics to a wider public, wrote, produced and narrated this gripping story.



Bob Osserman, Professor Emeritus at Stanford University and writer and producer of the Right Spin.

Production of the DVD was made possible by support from CMI, the Mathematical Sciences Research Institute, and the Joint Policy Board for Mathematics. The DVD was distributed in March 2005 to mathematics departments as part of Math Awareness Month. It tells a compelling story about powerful uses of mathematics. A limited number of copies are available on request from CMI. E-mail: rightspin@claymath.org.



NASA Astronaut Michael Foale.

$$I_1 \frac{d\Omega_1}{dt} + (I_3 - I_2)\Omega_2\Omega_3 = \tau_1$$

$$I_2 \frac{d\Omega_2}{dt} + (I_1 - I_3)\Omega_3\Omega_1 = \tau_2$$

$$I_3 \frac{d\Omega_3}{dt} + (I_2 - I_1)\Omega_1\Omega_2 = \tau_3$$

The equations which govern the angular motion of a rigid body, such as a top or a space station, were discovered by Leonhard Euler (1707–1783). The angular velocity vector has components Ω_i , the applied torque has components τ_i , and the eigenvalues of the inertia tensor are I_1 , I_2 , and I_3 .