CLAIMS

1. An apparatus comprising:

a rotor configured to rotate about an axis of rotation, the rotor including one or more magnets that generate first magnetic flux in an active region;

a first conductive sheet positioned within the active region so that generation of eddy currents within the first conductive sheet imposes a drag force on the rotor;

a stator structure including at least a first winding positioned within the active region;

at least a first switch configured and arranged to regulate a flow of current through the first winding; and

control circuitry configured to adjust a manner in which the first switch is operated to selectively supplement or selectively counteract the drag force on the rotor.

2. The apparatus of claim 1, wherein:

the stator structure has a generally planar shape; and

the apparatus is an axial flux machine in which the one or more magnets generate the first magnetic flux, generally parallel to the axis of rotation, within a gap in which the stator structure is positioned.

3. The apparatus of claim 2, wherein:

the control circuitry is configured to operate the first switch to selectively couple first and second terminals of the first winding to a power source such that, during at least a first mode of operation of the axial flux machine, the first winding generates second magnetic flux generally parallel to the axis of rotation.

4. The apparatus of claim 2, wherein:

the control circuitry is configured to operate the first switch to selectively couple first and second terminals of the first winding to an energy storage element such that, during at least a first mode of operation of the axial flux machine, the energy storage element receives power generated by the first winding in response to rotation of the rotor.

5. The apparatus of claim 1, wherein:

the control circuitry is configured to operate the first switch to selectively couple first and second terminals of the first winding to an energy storage element such that, during at least a first mode of operation of the apparatus, the energy storage element receives power generated by the first winding in response to rotation of the rotor.

6. The apparatus of claim 1, wherein:

the first switch is configured and arranged to be selectively closed to establish an electrical connection between first and second terminals of the first winding at a time that the first winding is not coupled to an external power source.

7 The apparatus of claim 6, wherein the first switch is further configured and arranged to selectively establish the electrical connection between the first and second terminals via at least one dissipative element.

8. The apparatus of claim 7, wherein:

the control circuitry is further configured to cause the first switch to be modulated to control a time average conductivity between the first and second terminals.

9. The apparatus of claim 6, wherein:

the control circuity is further configured to cause the first switch to be modulated to control a time average conductivity between the first and second terminals.

10. The apparatus of claim 1, wherein:

the control circuitry is configured to operate the first switch to selectively couple first and second terminals of the first winding to a power source such that, during at least a first mode of operation of the apparatus, the first winding generates second magnetic flux.

11. The apparatus of claim 1, wherein:

the control circuitry is configured to operate the first switch to selectively couple first and second terminals of the first winding to an energy storage element such that, during at least a first mode of operation of the apparatus, the energy storage element receives power generated by the first winding in response to rotation of the rotor.

12. The apparatus of claim 1, wherein:

the first switch is configured and arranged to be selectively closed to establish an electrical connection between first and second terminals of the first winding at a time that the first winding is not coupled to an external power source.

13. The apparatus of claim 12, wherein the first switch is further configured and arranged to selectively establish the electrical connection between the first and second terminals via at least one dissipative element.

14. The apparatus of claim 13, wherein:

the control circuitry is further configured to cause the first switch to be modulated to control a time average conductivity between the first and second terminals.

15. The apparatus of claim 12, wherein:

the control circuitry is further configured to cause the first switch to be modulated to control a time average conductivity between the first and second terminals.

16. A method of operating the apparatus of claim 1, comprising:

using the control circuitry to operate the first switch in a first manner to supplement or counteract the drag force on the rotor by a first amount; and

using the control circuitry to operate the first switch in a second manner to supplement or counteract the drag force on the rotor by a second amount different than the first amount.

17. The method of claim 16, further comprising:

adjusting a position of the first conductive sheet relative to the active region to alter the drag force.

18. A method of operating the apparatus of claim 2, comprising:

using the control circuitry to operate the first switch in a first manner to supplement or counteract the drag force on the rotor by a first amount; and

using the control circuitry to operate the first switch in a second manner to supplement or counteract the drag force on the rotor by a second amount different than the first amount.

19. The method of claim 18, further comprising:

adjusting a position of the first conductive sheet relative to the active region to alter the drag force.

20. The method of claim 18, wherein:

using the control circuitry to operate the first switch in the first manner comprises using the control circuitry to operate the first switch to selectively couple first and second terminals of the first winding to a power source so that the first winding generates a first amount of second magnetic flux generally parallel to the axis of rotation; and

using the control circuitry to operate the first switch in the second manner comprises using the control circuitry to operate the first switch to selectively couple the first and second terminals to the power source so that the first winding generates a second amount of the second magnetic flux generally parallel to the axis of rotation, the second amount being different than the first amount.