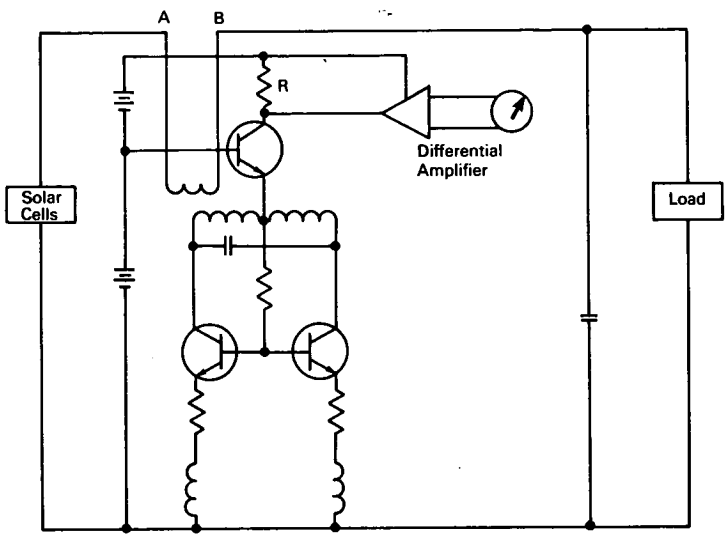
NASA TECH BRIEF

Control Circuit Ensures Solar Cell Operation at Maximum Power



The problem:

To design a circuit that will enable a solar cell power supply to deliver maximum electrical power to a load. The absolute values of electrical power generated by solar cells vary quite drastically with the differing environmental conditions (temperature, energetic-particle radiation, and illumination) in which the cells operate. Operation of the cells at a preselected voltage (or current) will not transfer maximum power to the load under a wide range of environmental conditions.

The solution:

A circuit that senses the magnitude of the slope (dE/dI) of the E-I (voltage-current) characteristic curve and compares it to a reference voltage which represents the slope corresponding to the desired operating limits (95 percent of the maximum power point).

How it's done:

An ac voltage of constant magnitude is applied across points AB. The ac loading effect, inversely proportional to the slope dE/dI of the E-I characteristic curve, will reflect a current through the transformer which results in a voltage across R. This voltage (corresponding to dE/dI) is then compared to a reference voltage which represents the desired slope. The differential amplifier will balance at the desired slope, and the meter indication will be either positive or negative (above or below the desired slope). This voltage difference may be utilized to control the power applied to the load.

(continued overleaf)

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B67-10061

Patent status:

No patent action is contemplated by NASA.

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