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## A NEW MODEL FOR ESTIMATING PROPORTIONS OF LAND COVER CLASSES WITHIN A PIXEL

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A new method for estimating proportions of land cover classes within a pixel (1) specifies a new model for the response of multispectral brightness to varying cover proportions; (2) uses unequal dispersion matrices for the classes; and (3) is executed with a table look-up algorithm suited to discretely-valued digital sensor data. The model provides an alternative to that developed by Horwitz, Nalepka, and others at the Environmental Research Institute of Michigan during 1973-1975, and allows easy sensitivity analysis as well as ready assessment of Type I error.

The model was tested on a winter Landsat image of the southern Sierra Nevada for three distinctive classes: forest, bare ground, and snow. Although field checks have not yet been performed to ascertain accuracy, the model produces output which appears consistent with low level aerial photography and general field knowledge of the area.

This algorithm has been developed for use in Sierra Nevada surface radiation models currently under development by J. Dozier and D. Marks at the University of California at Santa Barbara. Knowledge of the proportion of canopy cover within a single pixel allows preparation of forest cover masks used in surface radiation models as well as providing the data base for modeling diffuse radiation contribution to snowmelt. Another area of possible application involving natural land cover is in forest inventory. Proportions of canopy cover within a pixel could be used as an estimator for timber volume present in a sparsely stocked stand.