

**Department of
Mathematical Sciences
Colloquium
Michigan Technological University
Fisher Hall 130
October 16, 2009
1:00 p.m.**



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The Mathematics of Progressive Lens Design

Abstract: Progressive addition lenses are prescribed to patients who need correction for both far and near visions. A progressive lens needs to have power that gradually changes from the far vision zone, used for example in driving, and the near vision zone, used for example in reading a map. The basics of optics and lens design will be described. In particular, it will be shown that the problem can be reduced to one of surface design. The surface design problem itself is solved by a variational approach, which can be further simplified by linearization, leading to a fourth order elliptic partial differential equations. Analysis of the resulting equations and development of a computational method are described. Numerical results are presented to illustrate the process of lens design.