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**Abigail L. Stevens\*** (as656@bard.edu), 30 Campus Road, Annandale-on-Hudson, NY 12504,  
and **Gidon Eshel** (geshel@bard.edu). *Perfecting Solar Greenhouse Design for Hudson Valley  
Winter Agriculture.*

The motivation behind developing a feasible solar greenhouse is to grow food organically and sustainably near metropolitan areas in winter. This will extend the growing period, increase productivity, localize production and reduce transportation cost, and reduce greenhouse gas emissions to almost-carbon-neutral agricultural production. We created a matrix of the  $x$ - $z$  cross section of the greenhouse, and used this to make a differentiation matrix to take the derivative of state vectors of the space. We plan to apply the differentiated state vector to the heat equation, to find the heated air flow inside the greenhouse. This will help us to optimize the thermodynamics of the solar greenhouse. (Received September 22, 2010)