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**Bill Bade\*** ([wsbade02@wpi.edu](mailto:wsbade02@wpi.edu)). *Optimization algorithms in portfolio management with non-linear constraints*. Preliminary report.

The objective in portfolio management is to choose a set of stocks with maximum return for a given level of risk. The collection of all such "efficient portfolios" is called the efficient frontier. For standard problems, there are very good algorithms to locate the efficient frontier. When non-linear, non-smooth constraints are added to the optimization problem, standard computational methods cannot be applied. This project develops an optimization algorithm tailored to the special structure provided by constraints on the sum of the absolute values of the positions; a book size constraint. The program generates the efficient frontier by scanning for corner portfolios, using the fact that optimal portfolios must satisfy a combination of equations (for each stock which is not zero) and inequalities (for each stock that is not in the solution). (This research was carried out at the REU at Worcester Polytechnic Institute.) (Received August 30, 2005)