

Overcoming difficulties in understanding of the nonlinear programming concepts

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ABSTRACT

The technology of education means something created to teach students by easiest, fastest, and best way. This paper presents several examples of using computer technology to clarify the nonlinear programming concepts.

Nonlinear optimization problems occur in mathematical modeling of real processes. Analysis of students' tries to solve these problems show the lack of understanding such concepts as level curve and level surface.

We had to step back and start with more simple problems. For example, to divide a given number A into two summands so that their product would be maximal or to find the radius and the height of a closed cylindrical surface of a given volume V having the minimal total surface, and so on.

At the beginning the students use methods, which are common in solving simple problems of finding extremum, afterwards they pass to method of Lagrange multipliers, and the gradient methods. To visualize the solution of nonlinear optimization problems the Maple functions `contourplot`, `fieldplot`, `gradplot` are proposed.

The active using of the graphic representation helps to overcome the difficulties in understanding of the basic concepts of nonlinear programming. CAS technologies give more long knowledge retention compared to traditional methods of teaching.

Keywords

I Nonlinear programming, Maple, student's motivation.