

# On Solving a Problem using Interval Methods

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## Introduction

Interval methods [2] are an approach to numerical computation which provide guaranteed bounds on the range of a quantity or function [1].

## Basic properties

The main property of interval methods is the inclusion property: If the arguments of an interval extension of an operator contain the true values, then so does the result.

**Proposition 1.** *If  $x \in [x]$  and  $y \in [y]$ , then  $x + y \in [x] + [y]$ .*

**Proposition 2.** *If  $x \in [x]$  and  $y \in [y]$ , then  $x - y \in [x] - [y]$ .*

Besides fundamental operations, such as addition, subtraction, multiplication, and division of intervals, more advanced methods are available that allow for solving sets of (non-)linear algebraic equations [2].

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## Main results

If  $[f]$  is an interval extension of  $f$ , then

$$x \in [x] \implies f(x) \in [f]([x]).$$

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## References

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