Numerical methods and personal computers

- Numerical methods are techniques by which it is possible to solve mathematical problems using arithmetic techniques. All numerical methods require a large amount of arithmetic calculations, which is why they started to be used until the computer was invented (mid-20th century).

- With the advent of the personal computer, these techniques became available for use by a wide range of the general population.

- Analytical techniques are very valuable, since they make it possible to obtain exact solutions (in the form of formulas) for certain problems.
  These techniques allow a better understanding of the problems considered, by considering the principles and factors involved.

- The methods represent a way to significantly increase the capacity to face and solve problems. For example, the integral

$$\int_0^1 e^{2x} x^s \, dx$$

  can be solved analytically, but if a numerical method program is available to evaluate it, considerable time and effort can be saved.

- Numerical methods are used in the analysis of large mechanical structures, in the analysis of automobile suspension, in the analysis of conveyor machines, in industrial plants, in mineral processing plants, in smelters, in the design of integrated circuits, etc.