# Numerical analysis NUAN

Creating, analysing, implementing, testing and improving algorithms for numerically solving mathematical problems.

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| **Guidance Notes:**Numerical analysis is the area of mathematics and computer science that creates, analyses, and implements algorithms for numerically solving mathematical problems. Numerical analysis is required for applications including, but not limited to:* simulations of physical systems
* machine learning
* data analytics

Numerical analysis is concerned with:* floating-point arithmetic and the resulting accumulation of rounding errors (integer arithmetic which has different considerations)
* consideration of the numerical stability, condition numbers, accuracy, computational complexity and usability of algorithms that solve mathematical problems.
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## Level 4

Creates moderately complex algorithms using a range of mathematical techniques and with sensitivity to the limitations of the techniques.
Uses sophisticated scientific computing and visualisation environments.
Assesses the stability, accuracy and efficiency of algorithms and makes or recommends improvements to them.
Iterates and improves models using feedback from experts as appropriate.

## Level 5

Creates, tests and improves complex algorithms that numerically solve real-world problems.
Develops mathematical and computational techniques to assist with numerical analysis.
Communicates limitations such as uncertainty and systematic errors.
Reviews algorithms for their conformance to design and performance standards.

## Level 6

Initiates the creation, testing, improvement and application of numerical algorithms that solve real-world mathematical problems.
Sets standards and strategies for the application of numerical analysis.
Leads the implementation of numerical analyses capabilities to ensure appropriate, consistent and effective usage across the organisation.

## Level 7

Directs the creation and review of a cross-functional, enterprise-wide approach and culture for numerical analysis.
Leads the development of the organisation’s numerical analysis capabilities and champions its use in solving real-world problems.