

The development and research of the advanced engineering mathematics toolbox by SCILAB*

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Abstract: The free scientific calculation software SCILAB can give us more convenience for class teaching and other applications. The operations in SCILAB are abundant, including many kinds of matrix operation and graphic display, as can be applied to scientific calculation, mathematical modeling, signal processing, decision optimization, linear or nonlinear control and so on. Furthermore, SCILAB can also be linked with tcl/tk and C, which can make us expatiate our aim more easily.

During the teaching of the advanced engineering mathematics, we found that some numerical calculations and simulations are very complex, such as matrix operations and numerical approximations. But learning and applying the mathematical theories to actual applications is a very important process in our class teaching. So we generate the idea of developing a toolbox, named advanced engineering mathematics, for our class teaching, which can combine the theory learning and numerical simulation together. Figure 1 shows the relations of different modules in our toolbox.

This toolbox can be divided into three main modules: matrix theory module, numerical analysis module and probability statistics module. In each module, the detailed specifications about the mathematical functions and theories are given, and some actual examples and related problems are also shown. This toolbox has very good man-machine interface so that you can get the right result only if you input legal data when you start the tool and follow the screen hints. If you input illegal information, the toolbox will prompt you automatically and you can input right information again. At the same time, this software also has a special man-machine search function, which is embodied in the search module.

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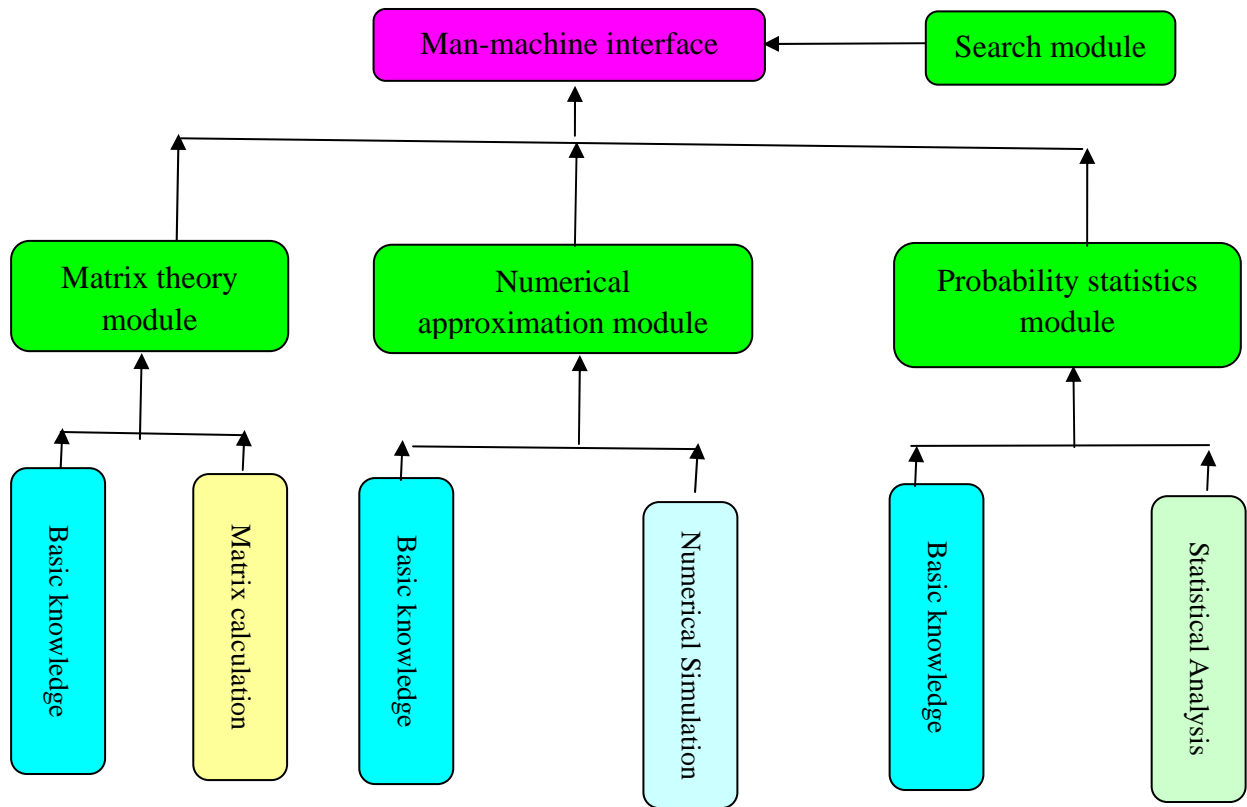


Figure 1 Module relation diagram

Notes: ① the green denotes the main modules of the same grade; ② the blue denotes the same part of the different modules;

③ the others denote the background operations of the three main modules but the search module.

Because they deal with the different cases, they are denoted by the different colors.

Key Words: SCILAB; Advanced engineering mathematics; Numerical calculation; Numerical simulation