Kriens, July 2020

Dear Readers

Apps are the new tools, which in today's world are capable of performing all sorts of tasks – from digital information for railway timetables to the tracking of viruses.

We have entered the world of apps as part of the project 'FlexOmega Measuring Rowing Power', because in terms of data communication, amount of memory, compatibility and size of the device, the smartphone and app is the ideal format for our application. During rowing, the sensor built into the shaft of the oar sends data via Bluetooth at 50 Hz to a smartphone mounted at the feet of the athlete.

After the FlexOmega Basic Version app, which was developed by InnoTix AG in 2018, our team is now getting a new versatile and expandable app off the ground. In contrast to general software development, where people often work on their own, the development of our app involved a new player: the app designer. In intensive meetings with users and engineers with constant sketching and revising of solutions on the flip chart, he formulates the links between screen, buttons and menus that underlie a user-optimized app. This results in a mock-up and only then is the app programmed by other professionals and based on the mock-up. This approach has been successfully applied to the development of the current Flex Omega app, and will also be used for the various expansions that are planned.

The app has been tried by three top-class rowers, who appreciated the simplicity, lightness and user-friendliness of the system. The affinity of the user is crucial for a successful app. By adopting an agile approach, the feedback and input provided by the user during development was taken into account and incorporated in the end product.

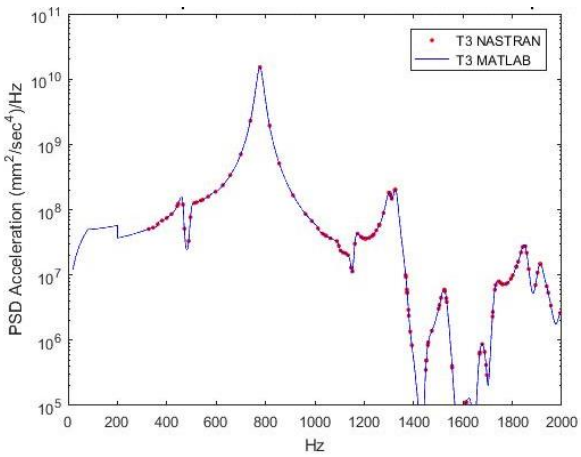
The engineer at the crossroads

When solving a mechanical problem, there always comes a point where the engineer reaches a crossroads. One road leads to mathematics combined with the laws of mechanics, the other road is a suitable program or appropriate software.

The first road is more enjoyable, because it is creative. On the other hand, the cost is difficult to estimate, because you can often get lost in misconceptions, numerical dead ends and unmanageable volumes of data. But if you make the effort, you can achieve a total overview from the underlying mathematical formulae to the results. Once again, the beauty and harmony of mathematics is confirmed, triggering in us a feeling of conviction and satisfaction. The second way always requires a learning phase, where you get into the logic of the program, in order to answer the fundamental question of its purpose. Today, this is mostly helped by software tutorials and self-explanatory intuitive forms (into which some numbers must be placed and boxes ticked). The calculation is started, and after a few minutes the results can be displayed with post-processing. The inputs are improved until the graph finally meets expectations. However, there are still some minor doubts. Have I ticked all the right boxes? Have I clicked in all the right places?

Through cross-checks and verifications, the doubts become infinitely small, so that here you also get a sense of security. Recently, I was able to confirm the NASTRAN spectra for a dynamic problem using MATLAB (see diagram).

With MATLAB and a ten-line script it was possible to



reproduce the partially opaque NASTRAN Femap calculation. This approach led to the conviction: Now it's right! Doubt is tending → 0.

Kind regards

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