KO-MIX

Interní seminář pracovníků KMD

Srdečně zveme pracovníky KMD, KAP a další zájemce z řad veřejnosti
na přednášku pořádanou v rámci odborného semináře *KO-MIX*

On Finite Element Method Application for Solution of Fluid-structure Interaction Problems

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Místo konání: **Kabinet KMD a KAP**
(Univerzitní nám. 1410/1, Liberec, budova G areálu TUL - 4. patro)

Abstrakt přednášky:

In this talk we shall focus on numerical approximation of the fluid and structural models coupled in a fluid structure interaction problem. First an attention shall be paid to the numerical approximation of incompressible fluid motion, which is described by the incompressible Navier-Stokes equations (INSE). In this case several sources of instabilities have to be treated. First, the couple of finite elements for velocity and pressure needs to satisfy Babuška-Brezzi (BB) condition in order to guarantee the stability of the scheme. Furthermore, high Reynolds numbers require the application of a suitable stabilization. Although there is a number of stabilization procedures used in many applications, the proper choice of stabilization parameters remains an open problem for Reynolds numbers in the range 10^4-10^6. Here, the abilization procedure based on Galerkin-Least squares method with an adapted mesh shall be used. For the considered case of high values of Reynolds number the turbulence modelling shall be shortly discussed.

The structure motion can be either modelled using two degrees of freedom (e.g., flexibly supported airfoil which can vertically oscillate and rotate around its elastic axis) or as a motion of the elastic body. The motion of elastic body is then described by Lamé's equations and spatially discretized with the aid of the Finite Element Method. The resulting system of ordinary differential equations shall be solved.

Last, the coupling of the fluid and structural models will be discussed. The fluid approximation on moving meshes will be treated with the aid of the Arbitrary Lagrangian-Eulerian (ALE) method. The weak, strong, and monolithic approaches to the coupling of the models will be discussed.

Za organizátory semináře srdečně zve

RNDr. Václav Finěk, Ph.D.