THESIS INFORMATION

Title: **Extended Galerkin meshfree methods for fracture modeling in advanced functional composite materials**

Major: **Engineering Mechanics**

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This thesis deals with the numerical computation of 2-D linear fracture problems using the two extended Galerkin meshless methods including radial point interpolation method (RPIM) and improved moving Kriging (MK) interpolation method. Enrichment techniques including the use of step function for crack faces, standard branch functions and new linear ramp function for crack tip are first applied in RPIM and MK meshless frameworks. The meshless moving Kriging method is improved by using three types of correlation function (i.e. quartic polynomial, truncated quartic polynomial and Gaussian functions) to eliminate the effect of the user numerical experience parameter and applied to crack problems. The developed methods are applied for crack analyzing in several types of material including isotropic, orthotropic and functionally graded composite materials. Various crack problems such as static, dynamic behavior of crack models and quasi-static crack propagation are numerically investigated and compared with solutions given by analytical, experiment or other numerical methods. The agreements between the obtained results using extended meshless methods and those of other methods show the correction of the developed approaches.

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