Kernel Parallelization Equation for Identifying Structures under Unknown and Periodic Loads

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Abstract : This paper presents a Kernel parallelization equation for damage identification in structures under unknown periodic excitations. Herein, the dynamic differential equation of the motion of structure is viewed as a mapping from displacements to external forces. Utilizing this viewpoint, a new method for damage detection in structures under periodic loads is presented. The developed method requires only two periods of load. The method detects the damages without finding the input loads. The method is based on the fact that structural displacements under free and forced vibrations are associated with two parallel subspaces in the displacement space. Considering the concept, kernel parallelization equation (KPE) is derived for damage detection under unknown periodic loads. The method is verified for a case study under periodic loads.