

THE CLOSED FORM REPRODUCING KERNEL  
PARTICLE SHAPE FUNCTIONS: PART 1.  
BASIC CONSTRUCTIONS: UNIFORMLY  
DISTRIBUTED PARTICLES

Hae-Soo Oh, June G. Kim, and Jaewoo Jeong

Preprint no. 2006-04

February 27, 2006

**Abstract**

It has been known that Reproducing Kernel Particle (RKP) shape functions with Kronecker delta property are not available in simple forms. Thus, in this paper, we first construct highly regular piecewise polynomial RKP shape functions that are reproducing of order  $k$  for any given integer  $k \geq 0$  and satisfy the Kronecker Delta Property. Second, we construct flexible Partition of Unity (PU) shape functions that make it possible for the closed form RKP shape functions to be used for locally uniformly distributed particles.