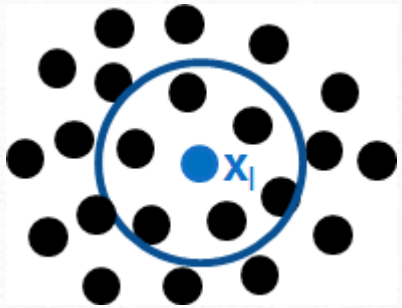
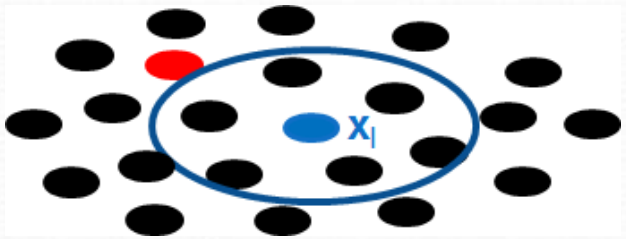
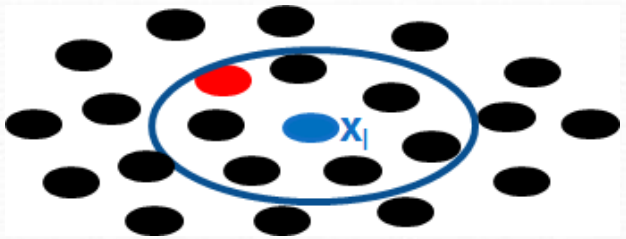
Meshfree Kernels



Initial

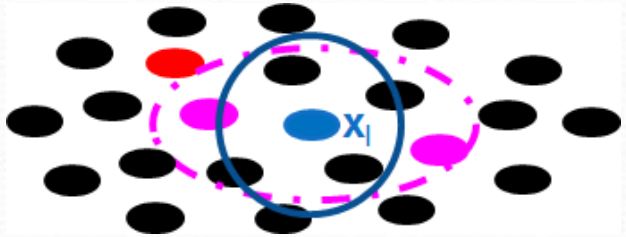


Total Lagrangian:
Neighbors defined on initial configuration, no update.
Accurate!

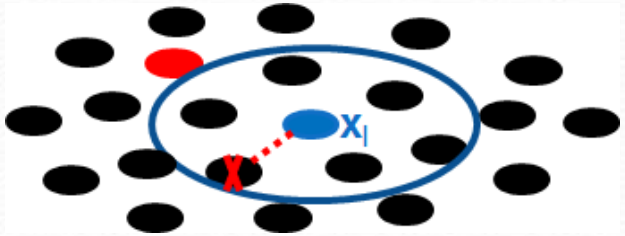


Updated Lagrangian:
Use deformed support to search neighbor particles on deformed configuration.

Meshfree support:
The compact region that the kernel function is NOT zero!



Eulerian:
Use undeformed support to search neighbor particles on deformed configuration.



Pseudo Lagrangian:
Neighbors defined on initial configuration, but might be lessened due to bond break.
Efficient and stable!

Parameters for *SECTION_SOLID_SPG (3)

```
*SECTION_SOLID_SPG
$#    SECID     ELFORM        AET
          2         47          0
$#       DX         DY         DZ    ISPLINE     KERNEL     LSCALE     SMSTEP     SWTIME
                                                      0
$       IDAM         FS    STRETCH        ITB                  ISC
                   0.45       1.20
```

- **KERNEL: type of kernel approximation**
  - **=0: updated Lagrangian, failure and non-failure analysis, small and large deformation**
    - **Metal shearing, riveting**
  - **=1: Eulerian, failure analysis, large and extreme deformation, global response**
    - **Metal shearing, cutting, drilling, FDS, riveting, implosion**
  - **=2: semi-pseudo Lagrangian kernel, failure analysis, extreme deformation, local response**
    - **Impact penetration, metal cutting, grinding, machining**

Kernel	Material	Major application
Updated Lagrangian	Metal	Tension-dominated & shear failure
Eulerian	Metal, Composite, Solid fluid	Shear failure
Semi–pseudo	Concrete, Composite, Metal	Shear failure