Parameter File

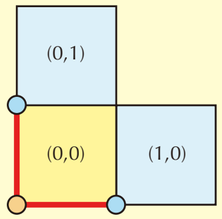
```
LATTICE = "square lattice"
MODEL   = "spin"
L       = 16
Jxy     = 1
Jz      = 2
SWEEPS  = 10000
THERMALIZATION = 1000

{ T = 0.1 }
{ T = 0.2 }
{ T = 0.5 }
{ T = 1.0 }
```

parameter2xml tool

Lattice XML File

square lattice

```
<LATTICES>
  <LATTICE name="square lattice" dimension="2">
    <PARAMETER name="a" default="1"/>
    <BASIS><VECTOR>a 0</VECTOR><VECTOR>0 a</VECTOR></BASIS>
  </LATTICE>
  <UNITCELL name="simple2d" dimension="2">
    <VERTEX/>
    <EDGE>
      <SOURCE vertex="1" offset="0 0"/>
      <TARGET vertex="1" offset="0 1"/>
    </EDGE>
    <EDGE>
      <SOURCE vertex="1" offset="0 0"/>
      <TARGET vertex="1" offset="1 0"/>
     </EDGE>
  </UNITCELL>
  <LATTICEGRAPH name="square lattice">
    <FINITELATTICE>
      <LATTICE ref="square lattice"/>
      <EXTENT dimension="1" size="L"/>
      <EXTENT dimension="2" size="L"/>
      <BOUNDARY type="periodic"/>
    </FINITELATTICE>
    <UNITCELL ref="simple2d"/>
  </LATTICEGRAPH>
</LATTICES>
```



Model XML File

$$H = J \sum_{<i,j>} [\, S_i^z S_j^z + (S_i^+ S_j^- + S_i^- S_j^+)/2 \,] - h \sum_i S_i^z$$

```
<MODELS>
  <BASIS name="spin">
    <SITEBASIS name="spin">
      <PARAMETER name="local_S" default="1/2"/>
      <QUANTUMNUMBER name="S" min="local_S" max="local_S"/>
      <QUANTUMNUMBER name="Sz" min="-S" max="S"/>
      <OPERATOR name="Sz" matrixelement="Sz"/>
      <OPERATOR name="Splus" matrixelement="sqrt(S*(S+1)-Sz*(Sz+1))">
        <CHANGE quantumnumber="Sz" change="1"/>
      </OPERATOR>
      <OPERATOR name="Sminus" matrixelement="sqrt(S*(S+1)-Sz*(Sz-1))">
        <CHANGE quantumnumber="Sz" change="-1"/>
      </OPERATOR>
    </SITEBASIS>
  </BASIS>
  <HAMILTONIAN name="spin">
    <PARAMETER name="J" default="1"/>
    <PARAMETER name="h" default="0"/>
    <BASIS ref="spin"/>
    <SITETERM>
      -h * Sz(i)
    </SITETERM>
    <BONDTERM source="i" target="j">
      J * (Sz(i)*Sz(j) + (Splus(i)*Sminus(j)+Sminus(i)*Splus(j)))/2
    </BONDTERM>
  </HAMILTONIAN>
</MODELS>
```

Parameter XML File

Quantum Lattice Model

application programs

Quantum Monte Carlo

Exact Diagonalization

DMRG

DMFT

Outputs in HDF5 & XML

Python based evaluation tools

Plots