

The OpenSees Quick Reference Guide

Version 1.1

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1 Modeling Commands

```
model modelBuilderType <specific model builder args>
  model BasicBuilder -ndm ndm? <-ndf ndf?>

node nodeTag? (ndm coordinates?) <-mass (ndf values?)>

mass nodeTag? (ndf values?)

uniaxialMaterial materialType <specific material args>
  uniaxialMaterial Elastic matTag? E? <eta?>
  uniaxialMaterial ElasticPP matTag? E? ep?
  uniaxialMaterial ElasticPPGap matTag? E? fy? gap?
  uniaxialMaterial Parallel matTag? tag1? tag2? ... <-min min?> <-max max?>
  uniaxialMaterial Series matTag? tag1? tag2? ...
  uniaxialMaterial Hardening matTag? E? sigmaY? H_iso? H_kin?
  uniaxialMaterial Steel01 matTag? fy? E0? b? <a1? a2? a3? a4?>
    <-min min?> <-max max?>
  uniaxialMaterial Concrete01 matTag? fpc? epsc0? fpcu? epscu?
    <-min min?> <-max max?>
  uniaxialMaterial Hysteretic matTag? s1p? e1p? s2p? e2p? <s3p? e3p?>
    s1n? e1n? s2n? e2n? <s3n? e3n?>
    pinchX? pinchY? damage1? damage2? <beta?>

nDMaterial materialType <specific material args>
  nDMaterial ElasticIsotropic matTag? E? v?
  nDMaterial J2Plasticity matTag? K? G? sig0? sigInf? delta? H?
  nDMaterial Bidirectional matTag? E? sigY? Hiso? Hkin?

section sectionType <specific section args>
  section Elastic secTag? E? A? Iz? <Iy? G? J?>
  section Generic1d secTag? matTag? code
  section GenericNd secTag? NDTag? code1 code2 ...
  section Aggregator secTag? matTag1? code1 matTag2? code2 ...
    <-section sectionTag?>
  section Fiber secTag? {
    fiber <fiber arguments>
```

```

    patch <patch arguments>
    layer <layer arguments>
}

fiber yLoc? zLoc? area? matTag?

patch patchType <specific patch args>
    patch quad matTag? numSubdivIJ? numSubdivJK? yVertI? zVertI? yVertJ? zVertJ?
        yVertK? zVertK? yVertL? zVertL?
    patch circ matTag? numSubdivCirc? numSubdivRad? yCenter? zCenter?
        intRad? extRad? startAng? endAng?

layer layerType <specific patch args>

    layer straight matTag? numReinfBars? reinfBarArea? yStartPt? zStartPt?
        yEndPt? zEndPt?
    layer circ matTag? numReinfBars? reinfBarArea?
        yCenter? zCenter? radius? startAng? endAng?

geomTransf transfType <specific transf args>
    geomTransf Linear transfTag? <-jntOffset dXi? dYi? dXj? dYj?>
    geomTransf Linear transfTag? vecxzX? vecxzY? vecxzZ?
        <-jntOffset dXi? dYi? dZi? dXj? dYj? dZj?>
    geomTransf LinearWithPDelta transfTag? <-jntOffset dXi? dYi? dXj? dYj?>
    geomTransf LinearWithPDelta transfTag? vecxzX? vecxzY? vecxzZ?
        <-jntOffset dXi? dYi? dZi? dXj? dYj? dZj?>

element eleType <specific element type args>
    element truss eleTag? iNode? jNode? A? matTag?
    element truss eleTag? iNode? jNode? secTag?
    element elasticBeamColumn eleTag? iNode? jNode? A? E? I? transfTag?
    element elasticBeamColumn eleTag? iNode? jNode? A? E? G? Jx? Jy? Jz? transfTag?
    element nonlinearBeamColumn eleTag? iNode? jNode? numIntgrPts? secTag? transfTag?
        <-mass massDens> <-iter maxIters tol>
    element beamWithHinges eleTag? iNode? jNode? secTagI? ratioI? secTagJ? ratioJ?
        E? A? I? transfTag? <-mass massDens> <-iter maxIters tol>
    element beamWithHinges eleTag? iNode? jNode? secTagI? ratioI? secTagJ? ratioJ?
        E? A? Jz? Jy? G? J? transfTag? <-mass massDens>
        <-iter maxIters tol>
    element zeroLength eleTag? iNode? jNode? -mat matTag1? matTag2? ...
        -dir dir1? dir2? ... <-orient x1? x2? x3? yp1? yp2? yp3?>
    element zeroLengthSection eleTag? iNode? jNode? secTag?
        -dir dir1? dir2? ... <-orient x1? x2? x3? yp1? yp2? yp3?>
    element zeroLengthND eleTag? iNode? jNode? matTag? <uniTag?>
        -dir dir1? dir2? ... <-orient x1? x2? x3? yp1? yp2? yp3?>
    element quad eleTag? iNode? jNode? kNode? lNode? thick? type matTag?
        <pressure? rho? b1? b2?>

```

```

fix nodeTag? (ndf values?)

seriesType <arguments for series type>
  Constant <-factor cFactor?>
  Linear <-factor cFactor?>
  Rectangular tStart? tFinish? <-factor cFactor?>
  Sine tStart? tFinish? period? <-shift shift?> <-factor cFactor?>
  Series -dt dt? -values {list of points} <-factor cFactor?>
  Series -time {list of times} -values {list of points} <-factor cFactor?>
  Series -dt dt? -filePath fileName? <-factor cFactor?>
  Series -fileTime fileName1? -filePath fileName2? <-factor cFactor?>

pattern patternType patternTag? <arguments for pattern type>
  pattern Plain patternTag? {TimeSeriesType and Args} {
    load ...
    sp ...
  }
  pattern UniformExcitation patternTag? dir? <-accel {SeriesType and args}>
    <-vel0 vel0?>
  pattern MultipleSupport patternTag? {
    groundMotion ...
    imposedMotion ...
  }

load nodeTag? (ndf values?) <-const> <-pattern patternTag?>

sp nodeTag? dofTag? value? <-const> <-pattern patternTag?>

groundMotion gMotionTag? gMotionType? <type args>
  groundMotion gMotionTag? Plain <-accel {SeriesType and Args}>
    <-vel {SeriesType and Args}>
    <-disp {SeriesType and Args}>
    <-int {IntegratorType and Args}>
  groundMotion gMotionTag? Interpolated gmTag1? gmTag2? ... -fact fact1? fact2? ...

imposedMotion nodeTag? dirn? gMotionTag?

equalDOF rNodeTag? cNodeTag? dof1? dof2? ...

rigidDiaphragm perpDirn? masterNodeTag? slaveNodeTag1 ...

rigidLink -type? masterNodeTag? slaveNodeTag

```

2 Analysis Commands

```
analysis analysisType
  analysis Static
  analysis Transient
  analysis VariableTransient

constraints constraintHandlerType <args for handler type>
  constraints Plain
  constraints Penalty alphaSP? alphaMP?
  constraints Lagrange <alphaSP?> <alphaMP?>
  constraints Transformation

integrator integratorType <args for integrator type>
  integrator LoadControl dlambda1? Jd? minLambda? maxLambda?
  integrator DisplacementControl nodeTag? dofTag? dU1? Jd? minDU? maxDU?
  integrator MinUnbalDispNorm dlambda1? Jd? minLambda? maxLambda?
  integrator ArcLength arclength? alpha?
  integrator Newmark gamma? beta? <alphaM? betaK? betaKinit? betaKcomm?>
  integrator HHT alpha? <alphaM? betaK? betaKinit? betaKcomm?>

algorithm algorithmType <args for algorithm type>
  algorithm Linear
  algorithm Newton
  algorithm NewtonLineSearch ratio?
  algorithm ModifiedNewton

test convergenceTestType <args for test type>
  test NormUnbalance tol? maxNumIter? <printFlag?>
  test NormDispIncr tol? maxNumIter? <printFlag?>
  test EnergyIncr tol? maxNumIter? <printFlag?>

numberer numbererType <args for numberer type>
  numberer Plain
  numberer RCM

system systemType <args for system type>
  system BandGeneral
  system BandSPD
  system ProfileSPD
  system SparseGeneral <-piv>
  system UmfPack
  system SparseSPD

analyze numIncr? <dt?> <dtMin?> <dtMax?> <Jd>

eigen numEigenvalues?
```

3 Output Command

```
recorder recorderType <args for type>
  recorder MaxNodeDisp dof? node1? node2? ...
  recorder Node fileName responseType <-time> -node node1? ... -dof dof1? ...
  recorder Element eleID1? ... <-file fileName> <-time> arg1? arg2? ...
  recorder display windowTitle? xLoc? yLoc? xPixels? yPixels? <-file fileName?>
  recorder plot fileName? windowTitle? xLoc? yLoc? xPixels? yPixels?
    <-columns xCol? yCol?>
```

```
print <fileName>
print <fileName> -node <-flag flag?> <node1? node2? ..>
print <fileName> -ele <-flag flag?> <ele1? ele2? ..>
```

```
database databaseType
  database File fileName
```

```
save commitTag?
```

```
restore commitTag?
```

4 Misc. Commands

```
reset
```

```
wipe
```

```
wipeAnalysis
```

```
loadConst <-time pseudoTime?>
```

```
time pseudoTime?
```

```
build
```

```
video -file fileName -window windowName?
```