|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | [**Used By**](https://graphviz.org/doc/info/attrs.html#h:uses) | **Type** | **Default** | **Default in code** | **Minimum** | **Comments** |
| [**\_background**](https://graphviz.org/doc/info/attrs.html#d:_background) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | <none> | nil |  | <none> is nil |
| [**area**](https://graphviz.org/doc/info/attrs.html#d:area) | NC | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | >0 | nil |
| [**arrowhead**](https://graphviz.org/doc/info/attrs.html#d:arrowhead) | E | [**arrowType**](https://graphviz.org/doc/info/attrs.html#k:arrowType) | normal |  |  |  |
| [**arrowsize**](https://graphviz.org/doc/info/attrs.html#d:arrowsize) | E | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | 0.0 |  |
| [**arrowtail**](https://graphviz.org/doc/info/attrs.html#d:arrowtail) | E | [**arrowType**](https://graphviz.org/doc/info/attrs.html#k:arrowType) | normal |  |  |  |
| [**bb**](https://graphviz.org/doc/info/attrs.html#d:bb) | G | [**rect**](https://graphviz.org/doc/info/attrs.html#k:rect) |  |  |  |  |
| [**bgcolor**](https://graphviz.org/doc/info/attrs.html#d:bgcolor) | GC | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) [**colorList**](https://graphviz.org/doc/info/attrs.html#k:colorList) | <none> |  |  | Handle multi types.  Current is color |
| [**center**](https://graphviz.org/doc/info/attrs.html#d:center) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**charset**](https://graphviz.org/doc/info/attrs.html#d:charset) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "UTF-8" |  |  |  |
| [**class**](https://graphviz.org/doc/info/attrs.html#d:class) | ENCG | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  | Represented by \_class |
| [**clusterrank**](https://graphviz.org/doc/info/attrs.html#d:clusterrank) | G | [**clusterMode**](https://graphviz.org/doc/info/attrs.html#k:clusterMode) | local |  |  |  |
| [**color**](https://graphviz.org/doc/info/attrs.html#d:color) | ENC | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) [**colorList**](https://graphviz.org/doc/info/attrs.html#k:colorList) | black |  |  | Handle multi types.  Current is color |
| [**colorscheme**](https://graphviz.org/doc/info/attrs.html#d:colorscheme) | ENCG | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**comment**](https://graphviz.org/doc/info/attrs.html#d:comment) | ENG | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**compound**](https://graphviz.org/doc/info/attrs.html#d:compound) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**concentrate**](https://graphviz.org/doc/info/attrs.html#d:concentrate) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**constraint**](https://graphviz.org/doc/info/attrs.html#d:constraint) | E | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**Damping**](https://graphviz.org/doc/info/attrs.html#d:Damping) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.99 |  | 0.0 |  |
| [**decorate**](https://graphviz.org/doc/info/attrs.html#d:decorate) | E | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**defaultdist**](https://graphviz.org/doc/info/attrs.html#d:defaultdist) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1+(avg. len)\*sqrt(|V|) |  | epsilon | Epsilon: probably Double value. Need to add the formula |
| [**dim**](https://graphviz.org/doc/info/attrs.html#d:dim) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 2 |  | 2 |  |
| [**dimen**](https://graphviz.org/doc/info/attrs.html#d:dimen) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 2 |  | 2 |  |
| [**dir**](https://graphviz.org/doc/info/attrs.html#d:dir) | E | [**dirType**](https://graphviz.org/doc/info/attrs.html#k:dirType) | forward(directed) none(undirected) |  |  | Dual attribute. Cannot handle now |
| [**diredgeconstraints**](https://graphviz.org/doc/info/attrs.html#d:diredgeconstraints) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  | Handle multi types.  Current is bool |
| [**distortion**](https://graphviz.org/doc/info/attrs.html#d:distortion) | N | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.0 |  | -100.0 |  |
| [**dpi**](https://graphviz.org/doc/info/attrs.html#d:dpi) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 96.0 0.0 |  |  | Handle multi default.  Current is nil |
| [**edgehref**](https://graphviz.org/doc/info/attrs.html#d:edgehref) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  | escString same as string |
| [**edgetarget**](https://graphviz.org/doc/info/attrs.html#d:edgetarget) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | <none> |  |  | <none> is nil |
| [**edgetooltip**](https://graphviz.org/doc/info/attrs.html#d:edgetooltip) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  | escString same as string |
| [**edgeURL**](https://graphviz.org/doc/info/attrs.html#d:edgeURL) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  | escString same as string |
| [**epsilon**](https://graphviz.org/doc/info/attrs.html#d:epsilon) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | .0001 \* # nodes(mode == KK) .0001(mode == major) .01(mode == sgd) |  |  | Handle multi default.  Current is nil |
| [**esep**](https://graphviz.org/doc/info/attrs.html#d:esep) | G | [**addDouble**](https://graphviz.org/doc/info/attrs.html#k:addDouble) [**addPoint**](https://graphviz.org/doc/info/attrs.html#k:addPoint) | +3 |  |  |  |
| [**fillcolor**](https://graphviz.org/doc/info/attrs.html#d:fillcolor) | NEC | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) [**colorList**](https://graphviz.org/doc/info/attrs.html#k:colorList) | lightgrey(nodes) black(clusters) |  |  | Handle multi types and multi default.  Current is color and nil |
| [**fixedsize**](https://graphviz.org/doc/info/attrs.html#d:fixedsize) | N | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | false |  |  | Handle multi types.  Current is bool |
| [**fontcolor**](https://graphviz.org/doc/info/attrs.html#d:fontcolor) | ENGC | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) | black |  |  |  |
| [**fontname**](https://graphviz.org/doc/info/attrs.html#d:fontname) | ENGC | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "Times-Roman" |  |  |  |
| [**fontnames**](https://graphviz.org/doc/info/attrs.html#d:fontnames) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**fontpath**](https://graphviz.org/doc/info/attrs.html#d:fontpath) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | system-dependent |  |  | Support system-default. Current is nil |
| [**fontsize**](https://graphviz.org/doc/info/attrs.html#d:fontsize) | ENGC | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 14.0 |  | 1.0 |  |
| [**forcelabels**](https://graphviz.org/doc/info/attrs.html#d:forcelabels) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**gradientangle**](https://graphviz.org/doc/info/attrs.html#d:gradientangle) | NCG | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | "" |  |  | Not sure how to handle “” as int? |
| [**group**](https://graphviz.org/doc/info/attrs.html#d:group) | N | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**head\_lp**](https://graphviz.org/doc/info/attrs.html#d:head_lp) | E | [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**headclip**](https://graphviz.org/doc/info/attrs.html#d:headclip) | E | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**headhref**](https://graphviz.org/doc/info/attrs.html#d:headhref) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  | escString same as string |
| [**headlabel**](https://graphviz.org/doc/info/attrs.html#d:headlabel) | E | [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString) | "" |  |  | [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString)  same as string |
| [**headport**](https://graphviz.org/doc/info/attrs.html#d:headport) | E | [**portPos**](https://graphviz.org/doc/info/attrs.html#k:portPos) | center |  |  |  |
| [**headtarget**](https://graphviz.org/doc/info/attrs.html#d:headtarget) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | <none> |  |  | <none> is nil |
| [**headtooltip**](https://graphviz.org/doc/info/attrs.html#d:headtooltip) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**headURL**](https://graphviz.org/doc/info/attrs.html#d:headURL) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**height**](https://graphviz.org/doc/info/attrs.html#d:height) | N | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.5 |  | 0.02 |  |
| [**href**](https://graphviz.org/doc/info/attrs.html#d:href) | GCNE | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**id**](https://graphviz.org/doc/info/attrs.html#d:id) | GCNE | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**image**](https://graphviz.org/doc/info/attrs.html#d:image) | N | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**imagepath**](https://graphviz.org/doc/info/attrs.html#d:imagepath) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**imagepos**](https://graphviz.org/doc/info/attrs.html#d:imagepos) | N | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "mc" |  |  |  |
| [**imagescale**](https://graphviz.org/doc/info/attrs.html#d:imagescale) | N | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | false |  |  | Handle multi types.  Current is bool |
| [**inputscale**](https://graphviz.org/doc/info/attrs.html#d:inputscale) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | <none> |  |  | <none> is nil |
| [**K**](https://graphviz.org/doc/info/attrs.html#d:K) | GC | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.3 |  | 0 |  |
| [**label**](https://graphviz.org/doc/info/attrs.html#d:label) | ENGC | [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString) | "\N" (nodes) "" (otherwise) |  |  | Handle multi default.  Current is nil |
| [**label\_scheme**](https://graphviz.org/doc/info/attrs.html#d:label_scheme) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 0 |  | 0 |  |
| [**labelangle**](https://graphviz.org/doc/info/attrs.html#d:labelangle) | E | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | -25.0 |  | -180.0 |  |
| [**labeldistance**](https://graphviz.org/doc/info/attrs.html#d:labeldistance) | E | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | 0.0 |  |
| [**labelfloat**](https://graphviz.org/doc/info/attrs.html#d:labelfloat) | E | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**labelfontcolor**](https://graphviz.org/doc/info/attrs.html#d:labelfontcolor) | E | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) | black |  |  |  |
| [**labelfontname**](https://graphviz.org/doc/info/attrs.html#d:labelfontname) | E | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "Times-Roman" |  |  |  |
| [**labelfontsize**](https://graphviz.org/doc/info/attrs.html#d:labelfontsize) | E | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 14.0 |  | 1.0 |  |
| [**labelhref**](https://graphviz.org/doc/info/attrs.html#d:labelhref) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**labeljust**](https://graphviz.org/doc/info/attrs.html#d:labeljust) | GC | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "c" |  |  |  |
| [**labelloc**](https://graphviz.org/doc/info/attrs.html#d:labelloc) | NGC | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "t"(clusters) "b"(root graphs) "c"(nodes) |  |  | Handle multi default.  Current is nil |
| [**labeltarget**](https://graphviz.org/doc/info/attrs.html#d:labeltarget) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | <none> |  |  | <none> is nil |
| [**labeltooltip**](https://graphviz.org/doc/info/attrs.html#d:labeltooltip) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**labelURL**](https://graphviz.org/doc/info/attrs.html#d:labelURL) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**landscape**](https://graphviz.org/doc/info/attrs.html#d:landscape) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**layer**](https://graphviz.org/doc/info/attrs.html#d:layer) | ENC | [**layerRange**](https://graphviz.org/doc/info/attrs.html#k:layerRange) | "" |  |  |  |
| [**layerlistsep**](https://graphviz.org/doc/info/attrs.html#d:layerlistsep) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "," |  |  |  |
| [**layers**](https://graphviz.org/doc/info/attrs.html#d:layers) | G | [**layerList**](https://graphviz.org/doc/info/attrs.html#k:layerList) | "" |  |  |  |
| [**layerselect**](https://graphviz.org/doc/info/attrs.html#d:layerselect) | G | [**layerRange**](https://graphviz.org/doc/info/attrs.html#k:layerRange) | "" |  |  |  |
| [**layersep**](https://graphviz.org/doc/info/attrs.html#d:layersep) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | ":\t " |  |  |  |
| [**layout**](https://graphviz.org/doc/info/attrs.html#d:layout) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**len**](https://graphviz.org/doc/info/attrs.html#d:len) | E | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0(neato) 0.3(fdp) |  |  | Handle multi default.  Current is nil |
| [**levels**](https://graphviz.org/doc/info/attrs.html#d:levels) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | MAXINT |  | 0.0 |  |
| [**levelsgap**](https://graphviz.org/doc/info/attrs.html#d:levelsgap) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.0 |  |  |  |
| [**lhead**](https://graphviz.org/doc/info/attrs.html#d:lhead) | E | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**lheight**](https://graphviz.org/doc/info/attrs.html#d:lheight) | GC | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) |  |  |  |  |
| [**lp**](https://graphviz.org/doc/info/attrs.html#d:lp) | EGC | [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**ltail**](https://graphviz.org/doc/info/attrs.html#d:ltail) | E | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**lwidth**](https://graphviz.org/doc/info/attrs.html#d:lwidth) | GC | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) |  |  |  |  |
| [**margin**](https://graphviz.org/doc/info/attrs.html#d:margin) | NCG | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**point**](https://graphviz.org/doc/info/attrs.html#k:point) | <device-dependent> |  |  | Handle multi types. Current is point |
| [**maxiter**](https://graphviz.org/doc/info/attrs.html#d:maxiter) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 100 \* # nodes(mode == KK) 200(mode == major) 30(mode == sgd) 600(fdp) |  |  | Handle multi default.  Current is nil |
| [**mclimit**](https://graphviz.org/doc/info/attrs.html#d:mclimit) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  |  |  |
| [**mindist**](https://graphviz.org/doc/info/attrs.html#d:mindist) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | 0.0 |  |
| [**minlen**](https://graphviz.org/doc/info/attrs.html#d:minlen) | E | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 1 |  | 0 |  |
| [**mode**](https://graphviz.org/doc/info/attrs.html#d:mode) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | major |  |  |  |
| [**model**](https://graphviz.org/doc/info/attrs.html#d:model) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | shortpath |  |  |  |
| [**mosek**](https://graphviz.org/doc/info/attrs.html#d:mosek) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**newrank**](https://graphviz.org/doc/info/attrs.html#d:newrank) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**nodesep**](https://graphviz.org/doc/info/attrs.html#d:nodesep) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.25 |  | 0.02 |  |
| [**nojustify**](https://graphviz.org/doc/info/attrs.html#d:nojustify) | GCNE | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**normalize**](https://graphviz.org/doc/info/attrs.html#d:normalize) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**notranslate**](https://graphviz.org/doc/info/attrs.html#d:notranslate) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**nslimit**](https://graphviz.org/doc/info/attrs.html#d:nslimit) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) |  |  |  |  |
| [**nslimit1**](https://graphviz.org/doc/info/attrs.html#d:nslimit1) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) |  |  |  |  |
| [**ordering**](https://graphviz.org/doc/info/attrs.html#d:ordering) | GN | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**orientation**](https://graphviz.org/doc/info/attrs.html#d:orientation) | NG | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | 0.0 "" |  | 360.0 |  |
| [**outputorder**](https://graphviz.org/doc/info/attrs.html#d:outputorder) | G | [**outputMode**](https://graphviz.org/doc/info/attrs.html#k:outputMode) | breadthfirst |  |  |  |
| [**overlap**](https://graphviz.org/doc/info/attrs.html#d:overlap) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  | Handle multi types.  Current is bool |
| [**overlap\_scaling**](https://graphviz.org/doc/info/attrs.html#d:overlap_scaling) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | -4 |  | -1.0e10 | Handle minimum value. Current is nil |
| [**overlap\_shrink**](https://graphviz.org/doc/info/attrs.html#d:overlap_shrink) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**pack**](https://graphviz.org/doc/info/attrs.html#d:pack) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | false |  |  | Handle multi types.  Current is bool |
| [**packmode**](https://graphviz.org/doc/info/attrs.html#d:packmode) | G | [**packMode**](https://graphviz.org/doc/info/attrs.html#k:packMode) | node |  |  |  |
| [**pad**](https://graphviz.org/doc/info/attrs.html#d:pad) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**point**](https://graphviz.org/doc/info/attrs.html#k:point) | 0.0555 (4 points) |  |  |  |
| [**page**](https://graphviz.org/doc/info/attrs.html#d:page) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**pagedir**](https://graphviz.org/doc/info/attrs.html#d:pagedir) | G | [**pagedir**](https://graphviz.org/doc/info/attrs.html#k:pagedir) | BL |  |  |  |
| [**pencolor**](https://graphviz.org/doc/info/attrs.html#d:pencolor) | C | [**color**](https://graphviz.org/doc/info/attrs.html#k:color) | black |  |  |  |
| [**penwidth**](https://graphviz.org/doc/info/attrs.html#d:penwidth) | CNE | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | 0.0 |  |
| [**peripheries**](https://graphviz.org/doc/info/attrs.html#d:peripheries) | NC | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | shape default(nodes) 1(clusters) |  | 0 | Handle multi default.  Current is nil |
| [**pin**](https://graphviz.org/doc/info/attrs.html#d:pin) | N | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**pos**](https://graphviz.org/doc/info/attrs.html#d:pos) | EN | [**point**](https://graphviz.org/doc/info/attrs.html#k:point) [**splineType**](https://graphviz.org/doc/info/attrs.html#k:splineType) |  |  |  | Handle multi types |
| [**quadtree**](https://graphviz.org/doc/info/attrs.html#d:quadtree) | G | [**quadType**](https://graphviz.org/doc/info/attrs.html#k:quadType) [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | normal |  |  |  |
| [**quantum**](https://graphviz.org/doc/info/attrs.html#d:quantum) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.0 |  | 0.0 |  |
| [**rank**](https://graphviz.org/doc/info/attrs.html#d:rank) | S | [**rankType**](https://graphviz.org/doc/info/attrs.html#k:rankType) |  |  |  | Handle Subgraph generation |
| [**rankdir**](https://graphviz.org/doc/info/attrs.html#d:rankdir) | G | [**rankdir**](https://graphviz.org/doc/info/attrs.html#k:rankdir) | TB |  |  |  |
| [**ranksep**](https://graphviz.org/doc/info/attrs.html#d:ranksep) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**doubleList**](https://graphviz.org/doc/info/attrs.html#k:doubleList) | 0.5(dot) 1.0(twopi) |  | 0.02 |  |
| [**ratio**](https://graphviz.org/doc/info/attrs.html#d:ratio) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) |  |  |  |  |
| [**rects**](https://graphviz.org/doc/info/attrs.html#d:rects) | N | [**rect**](https://graphviz.org/doc/info/attrs.html#k:rect) |  |  |  |  |
| [**regular**](https://graphviz.org/doc/info/attrs.html#d:regular) | N | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | false |  |  |  |
| [**remincross**](https://graphviz.org/doc/info/attrs.html#d:remincross) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**repulsiveforce**](https://graphviz.org/doc/info/attrs.html#d:repulsiveforce) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1.0 |  | 0.0 |  |
| [**resolution**](https://graphviz.org/doc/info/attrs.html#d:resolution) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 96.0 0.0 |  |  | Handle multi default.  Current is nil |
| [**root**](https://graphviz.org/doc/info/attrs.html#d:root) | GN | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | <none>(graphs) false(nodes) |  |  | Handle multi types and multi default.  Current is bool and nil |
| [**rotate**](https://graphviz.org/doc/info/attrs.html#d:rotate) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 0 |  |  |  |
| [**rotation**](https://graphviz.org/doc/info/attrs.html#d:rotation) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0 |  |  |  |
| [**samehead**](https://graphviz.org/doc/info/attrs.html#d:samehead) | E | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**sametail**](https://graphviz.org/doc/info/attrs.html#d:sametail) | E | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**samplepoints**](https://graphviz.org/doc/info/attrs.html#d:samplepoints) | N | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 8(output) 20(overlap and image maps) |  |  | Handle multi default.  Current is nil |
| [**scale**](https://graphviz.org/doc/info/attrs.html#d:scale) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  | Handle multi types |
| [**searchsize**](https://graphviz.org/doc/info/attrs.html#d:searchsize) | G | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 30 |  |  |  |
| [**sep**](https://graphviz.org/doc/info/attrs.html#d:sep) | G | [**addDouble**](https://graphviz.org/doc/info/attrs.html#k:addDouble) [**addPoint**](https://graphviz.org/doc/info/attrs.html#k:addPoint) | +4 |  |  |  |
| [**shape**](https://graphviz.org/doc/info/attrs.html#d:shape) | N | [**shape**](https://graphviz.org/doc/info/attrs.html#k:shape) | ellipse |  |  | Has shapetypes as static const values |
| [**shapefile**](https://graphviz.org/doc/info/attrs.html#d:shapefile) | N | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**showboxes**](https://graphviz.org/doc/info/attrs.html#d:showboxes) | ENG | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 0 |  | 0 |  |
| [**sides**](https://graphviz.org/doc/info/attrs.html#d:sides) | N | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 4 |  | 0 |  |
| [**size**](https://graphviz.org/doc/info/attrs.html#d:size) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**skew**](https://graphviz.org/doc/info/attrs.html#d:skew) | N | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.0 |  | -100.0 |  |
| [**smoothing**](https://graphviz.org/doc/info/attrs.html#d:smoothing) | G | [**smoothType**](https://graphviz.org/doc/info/attrs.html#k:smoothType) | "none" |  |  |  |
| [**sortv**](https://graphviz.org/doc/info/attrs.html#d:sortv) | GCN | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) | 0 |  | 0 |  |
| [**splines**](https://graphviz.org/doc/info/attrs.html#d:splines) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) |  |  |  | Handle multi types.  Current is bool |
| [**start**](https://graphviz.org/doc/info/attrs.html#d:start) | G | [**startType**](https://graphviz.org/doc/info/attrs.html#k:startType) | "" |  |  |  |
| [**style**](https://graphviz.org/doc/info/attrs.html#d:style) | ENCG | [**style**](https://graphviz.org/doc/info/attrs.html#k:style) | "" |  |  |  |
| [**stylesheet**](https://graphviz.org/doc/info/attrs.html#d:stylesheet) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | "" |  |  |  |
| [**tail\_lp**](https://graphviz.org/doc/info/attrs.html#d:tail_lp) | E | [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**tailclip**](https://graphviz.org/doc/info/attrs.html#d:tailclip) | E | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) | true |  |  |  |
| [**tailhref**](https://graphviz.org/doc/info/attrs.html#d:tailhref) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**taillabel**](https://graphviz.org/doc/info/attrs.html#d:taillabel) | E | [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString) | "" |  |  |  |
| [**tailport**](https://graphviz.org/doc/info/attrs.html#d:tailport) | E | [**portPos**](https://graphviz.org/doc/info/attrs.html#k:portPos) | center |  |  |  |
| [**tailtarget**](https://graphviz.org/doc/info/attrs.html#d:tailtarget) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | <none> |  |  | <none> is nil |
| [**tailtooltip**](https://graphviz.org/doc/info/attrs.html#d:tailtooltip) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**tailURL**](https://graphviz.org/doc/info/attrs.html#d:tailURL) | E | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**target**](https://graphviz.org/doc/info/attrs.html#d:target) | ENGC | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) [**string**](https://graphviz.org/doc/info/attrs.html#k:string) | <none> |  |  | <none> is nil  Support multi types  Current is string |
| [**tooltip**](https://graphviz.org/doc/info/attrs.html#d:tooltip) | NEC | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | "" |  |  |  |
| [**truecolor**](https://graphviz.org/doc/info/attrs.html#d:truecolor) | G | [**bool**](https://graphviz.org/doc/info/attrs.html#k:bool) |  |  |  |  |
| [**URL**](https://graphviz.org/doc/info/attrs.html#d:URL) | ENGC | [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) | <none> |  |  | <none> is nil |
| [**vertices**](https://graphviz.org/doc/info/attrs.html#d:vertices) | N | [**pointList**](https://graphviz.org/doc/info/attrs.html#k:pointList) |  |  |  |  |
| [**viewport**](https://graphviz.org/doc/info/attrs.html#d:viewport) | G | [**viewPort**](https://graphviz.org/doc/info/attrs.html#k:viewPort) | "" |  |  |  |
| [**voro\_margin**](https://graphviz.org/doc/info/attrs.html#d:voro_margin) | G | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.05 |  | 0.0 |  |
| [**weight**](https://graphviz.org/doc/info/attrs.html#d:weight) | E | [**int**](https://graphviz.org/doc/info/attrs.html#k:int) [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 1 |  | 0(dot,twopi) 1(neato,fdp) | Handle multi minimum and multi types  Current is double and nil |
| [**width**](https://graphviz.org/doc/info/attrs.html#d:width) | N | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.75 |  | 0.01 |  |
| [**xdotversion**](https://graphviz.org/doc/info/attrs.html#d:xdotversion) | G | [**string**](https://graphviz.org/doc/info/attrs.html#k:string) |  |  |  |  |
| [**xlabel**](https://graphviz.org/doc/info/attrs.html#d:xlabel) | EN | [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString) | "" |  |  |  |
| [**xlp**](https://graphviz.org/doc/info/attrs.html#d:xlp) | NE | [**point**](https://graphviz.org/doc/info/attrs.html#k:point) |  |  |  |  |
| [**z**](https://graphviz.org/doc/info/attrs.html#d:z) | N | [**double**](https://graphviz.org/doc/info/attrs.html#k:double) | 0.0 |  | -MAXFLOAT -1000 | Not sure how to handle minimum |

Notes:

1. [**escString**](https://graphviz.org/doc/info/attrs.html#k:escString) and [**lblString**](https://graphviz.org/doc/info/attrs.html#k:lblString)are of type string in csdot
2. point is of class type with property: X, Y and Z (for dim=3)
3. Multi types are not yet supported. The supported ones have just one type, for example, attributes have bool and string will just have type bool
4. Most of multi-default are not supported.
5. <none> is specified as nil, which means it is not present in the code. So, the corresponding functions are absent.