

# CURVES

The curves scenegraph location, in addition to the standard Katana curves attributes, KtoA handles the following additional attributes:

- `arnoldStatements.*`: the various curve-related settings are applied. In particular, `curve_mode`, `curve_basis`, `min_pixel_width`, `flip_t`, and `curve_triplicate_endpoints` are used beyond the common settings available. Please see the `ArnoldObjectSettings` node for those curve settings.
- `geometry.arbitrary.st`: texture coordinates here are treated as per-curve values, and translated as root UVs for curves in Arnold. **Note** that there should be one ST (two floats) per curve, and the scope should be `primitive` (not `face`, `vertex` or `point`).
- `geometry.point.orientation`, `geometry.point.N`, `geometry.point.normal`: a three-float list of orientation vectors per curve point, indicating the direction the curve is facing. This only applies when `arnoldStatements.curve_mode` is oriented.
- Curve widths, listed in order of higher precedence (only one set is applied):
  - `geometry.curveWidthStart` and `geometry.curveWidthEnd`: float, per curve. These attributes allow the specification of a root and tip width for each curve.
  - **(deprecated)** `geometry.curves_width`: used only if `geometry.curves_ncurves` is present. One float width per varying value, or per curve point, or per curve.
  - `geometry.point.width`: float, one per varying value, or per point, or per curve. Semantically it is recommended to use this per point or per varying value.
  - `geometry.width`: float, one per varying value, or per point, or per curve. Semantically, it is recommended to use this per curve.
  - `geometry.constantWidth`: float, one value for the whole location.
  - **(deprecated)** `geometry.point.constantWidth`: float, one value for the whole location.
  - `geometry.curveWidthEnd`: float, per curve. This option attribute is used instead of use `geometry.point.width` or `geometry.point.constantWidth` if present, this attribute allows the specification of a tip width for each curve.
- **(deprecated)** `geometry.curves_pointList`: legacy synonym for `geometry.point.P`
- **(deprecated)** `geometry.curves_nvertices`: legacy synonym for `geometry.numVertices`
- **(deprecated)** `geometry.curveMode`: legacy synonym for `arnoldStatements.curve_mode`

Currently, standard curves location attributes `geometry.degree` and `geometry.knots` are ignored, but will likely be supported in some fashion in a future KtoA release.

## Arbitrary Data Sizes

Arbitrary data for curves is a bit of a special case, because Katana normally vets arbitrary data scope such as `face` or `point` against `polymesh` or `subdmesh` location attributes to make sure there are the right number of values. Because curves lack those attributes, only `primitive` scope should be used for curves arbitrary attributes. In a future version of KtoA additional scopes will be properly supported for curves.