

# Schema documentation for drakeURDF.xsd

september 7, 2013

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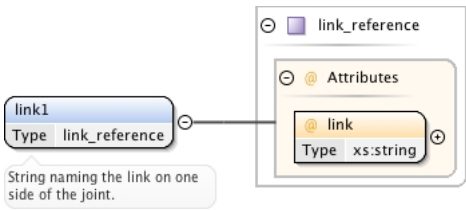
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## Schema(s)

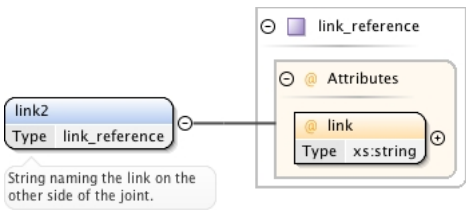
### Main schema drakeURDF.xsd

## Element(s)

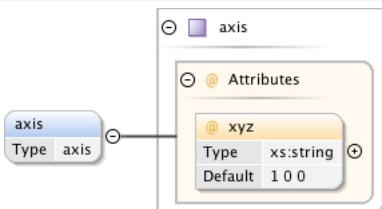
### Element loop\_joint / link1

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	link	xs:string	required	

### Element loop\_joint / link2

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	link	xs:string	required	

### Element loop\_joint / axis

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	xyz	xs:string	1 0 0	optional

## Element `force_element` / `linear_spring_damper`

Diagram					
Children	link1, link2				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>damping</b>	xs:double	0	optional	
	in Newton seconds per meter. positive values resist motion.				
	<b>rest_length</b>	xs:double	0	optional	
	<b>stiffnes</b>	xs:double	0	optional	
	in Newtons per meter				

## Element `linear_spring_damper` / `link1`

Diagram				
Children	origin			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>link</b>	xs:string	required	

## Element `link_reference_w_pose` / `origin`

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>rpy</b>	xs:string	0 0 0	optional	
		Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.			
	<b>xyz</b>	xs:string	0 0 0	optional	
		Represents the Cartesian offset			

## Element `linear_spring_damper` / `link2`

Diagram					
Children	origin				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	<b>link</b>	xs:string	required		

## Element `force_element` / `wing`

Diagram	<p>The diagram illustrates the structure of the <code>wing</code> element. It is a container for several attributes and two children. The attributes are:</p> <ul style="list-style-type: none"> <li><code>profile</code> (Type: <code>xs:string</code>): one of the following strings: - The path to a .mat file that can be loaded and contains the three variables 'CLSpline,...</li> <li><code>chord</code> (Type: <code>xs:double</code>): the chord length in meters.</li> <li><code>span</code> (Type: <code>xs:double</code>): the span of the wing in meters.</li> <li><code>stall_angle</code> (Type: <code>xs:double</code>): the angle in degrees upon which the lift and drag performance returns to that of a flat plate. (this value is ignored...</li> <li><code>nominal_speed</code> (Type: <code>xs:double</code>): an approximate nominal speed in meters per second used to calculate the Reynolds number around which we design the...</li> </ul> <p>The children are:</p> <ul style="list-style-type: none"> <li><code>parent</code> (Type: <code>link_reference</code>): String naming the link on which this wing is attached.</li> <li><code>origin</code> (Type: <code>pose</code>): This defines the position of the quarter-chord point of the airfoil, since that is the reference point used for the...</li> </ul> <p>A note points to the <code>wing</code> element: See RigidBodyWing.m for more documentation</p>			
Children	origin, parent			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>chord</b>	<code>xs:double</code>	optional	
		the chord length in meters.		
	<b>nominal_speed</b>	<code>xs:double</code>	optional	
		an approximate nominal speed in meters per second used to calculate the Reynolds number around which we design the aerodynamic coefficients.		
	<b>profile</b>	<code>xs:string</code>	optional	
		one of the following strings: • The path to a .mat file that can be loaded and contains the three variables "CLSpline, CDSpline, CMSpline" • The string, 'flat plate' 39 • File location of a .dat file generated by Xfoil • A NACA airfoil designation: 'NACA0012'		
	<b>span</b>	<code>xs:double</code>	optional	
		the span of the wing in meters.		
	<b>stall_angle</b>	<code>xs:double</code>	optional	
		the angle in degrees upon which the lift and drag performance returns to that of a flat plate. (this value is ignored if the profile is set to a flat plate).		

## Element wing / parent

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>link</b>	xs:string	required	

## Element wing / origin

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	<b>rpy</b>	xs:string	0 0 0	optional
				Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.
	<b>xyz</b>	xs:string	0 0 0	optional
				Represents the Cartesian offset

## Element force\_element / thrust

Diagram				
	<b>lower_limit</b>	xs:double	-INF	
	<b>upper_limit</b>	xs:double	INF	
	<b>scale_factor</b>	xs:double	1	scales the dimensionless input to Newtons of force.
	<b>parent</b>	link_reference		String naming the link on which the force will be applied.
	<b>origin</b>	pose		Designates the point (in link coordinates) where the force will be applied and direction (along the z axis) after the...

Children	origin, parent				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>lower_limit</b>	xs:double	-INF	optional	
	<b>scale_factor</b>	xs:double	1	optional	
		scales the dimensionless input to Newtons of force.			
	<b>upper_limit</b>	xs:double	INF	optional	

## Element thrust / parent

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	<b>link</b>	xs:string	required		

## Element thrust / origin

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>rpy</b>	xs:string	0 0 0	optional	
		Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.			
	<b>xyz</b>	xs:string	0 0 0	optional	
		Represents the Cartesian offset			

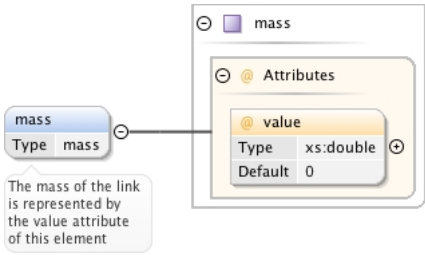
## Element inertial / origin

Diagram					
	<p>This is the pose of the inertial reference frame, relative to the link reference frame. The origin of the inertial...</p>				

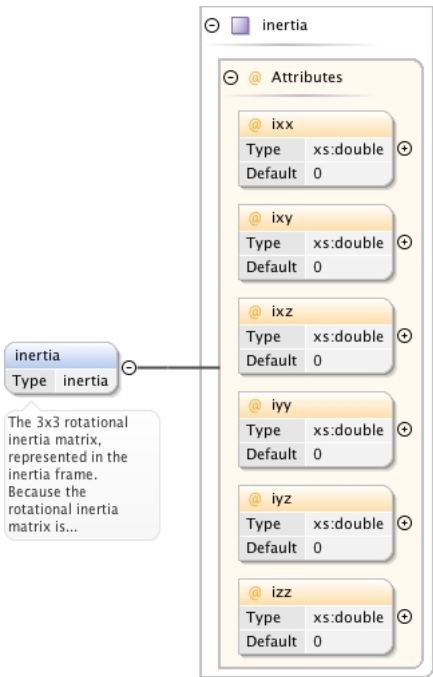


Attributes	QName	Type	Default	Use	
	<b>rpy</b>	xs:string	0 0 0	optional	
		Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.			
	<b>xyz</b>	xs:string	0 0 0	optional	
		Represents the Cartesian offset			

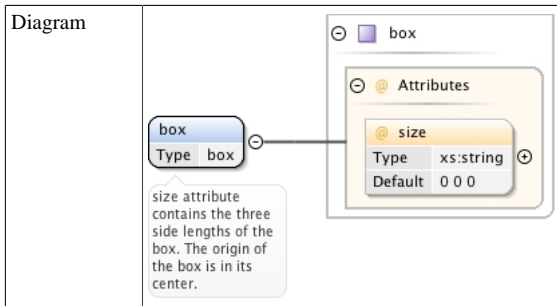
## Element `inertial / mass`

Diagram					
Attributes	QName	Type	Default	Use	
	<b>value</b>	xs:double	0	optional	

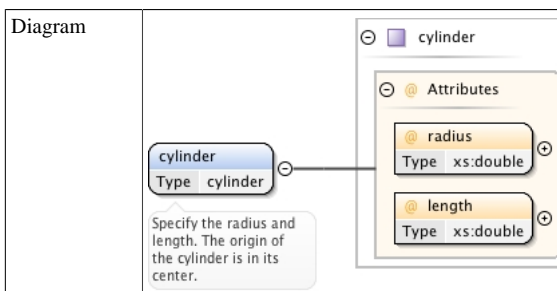
## Element `inertial / inertia`

Diagram					
Attributes	QName	Type	Default	Use	
	<b>ixx</b>	xs:double	0	optional	
	<b>ixy</b>	xs:double	0	optional	
	<b>ixz</b>	xs:double	0	optional	
	<b>iyy</b>	xs:double	0	optional	
	<b>iyz</b>	xs:double	0	optional	
	<b>izz</b>	xs:double	0	optional	

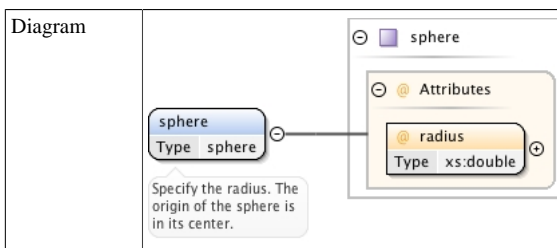
## Element geometry / box

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	size	xs:string	0 0 0	optional	

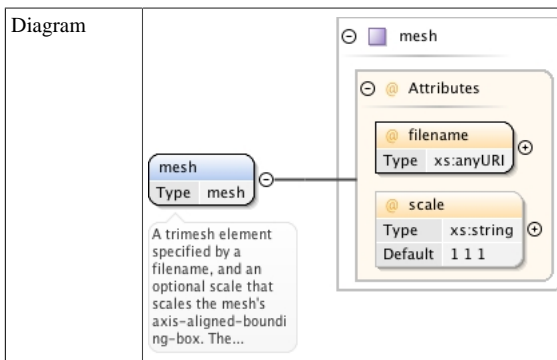
## Element geometry / cylinder

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	length	xs:double	required		
	radius	xs:double	required		

## Element geometry / sphere

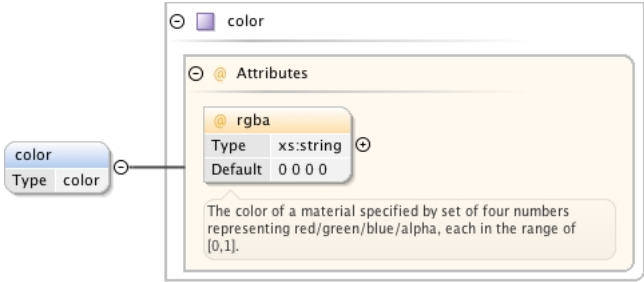
Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	radius	xs:double	required		

## Element geometry / mesh

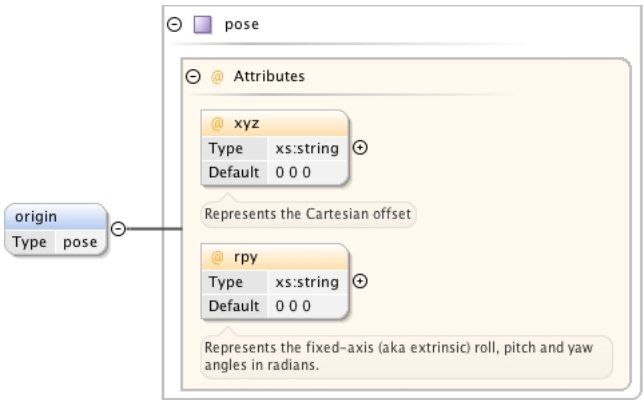
Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	filename	xs:anyURI			
	scale	xs:string	Default 1 1 1		

Attributes	QName	Type	Default	Use	
	<b>filename</b>	xs:anyURI		required	
	<b>scale</b>	xs:string	1 1 1	optional	

## Element material / color

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>rgba</b>	xs:string	0 0 0 0	optional	
		The color of a material specified by set of four numbers representing red/green/blue/alpha, each in the range of [0,1].			

## Element visual / origin

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>rpy</b>	xs:string	0 0 0	optional	
		Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.			
	<b>xyz</b>	xs:string	0 0 0	optional	
		Represents the Cartesian offset			

## Element visual / geometry

Diagram	
Children	box, cylinder, mesh, sphere

## Element visual / material

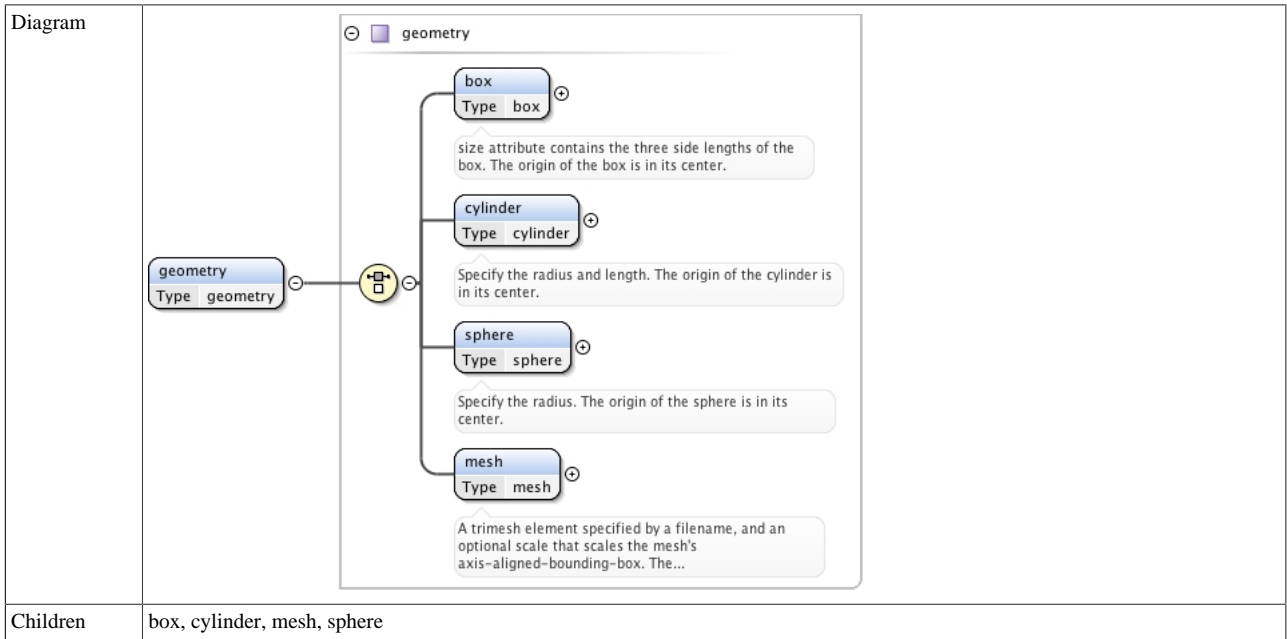
Diagram												
Children	color											
Attributes	<table><thead><tr><th>QName</th><th>Type</th><th>Use</th><th></th></tr></thead><tbody><tr><td>name</td><td>xs:string</td><td>optional</td><td></td></tr></tbody></table>	QName	Type	Use		name	xs:string	optional				
QName	Type	Use										
name	xs:string	optional										

## Element collision / origin

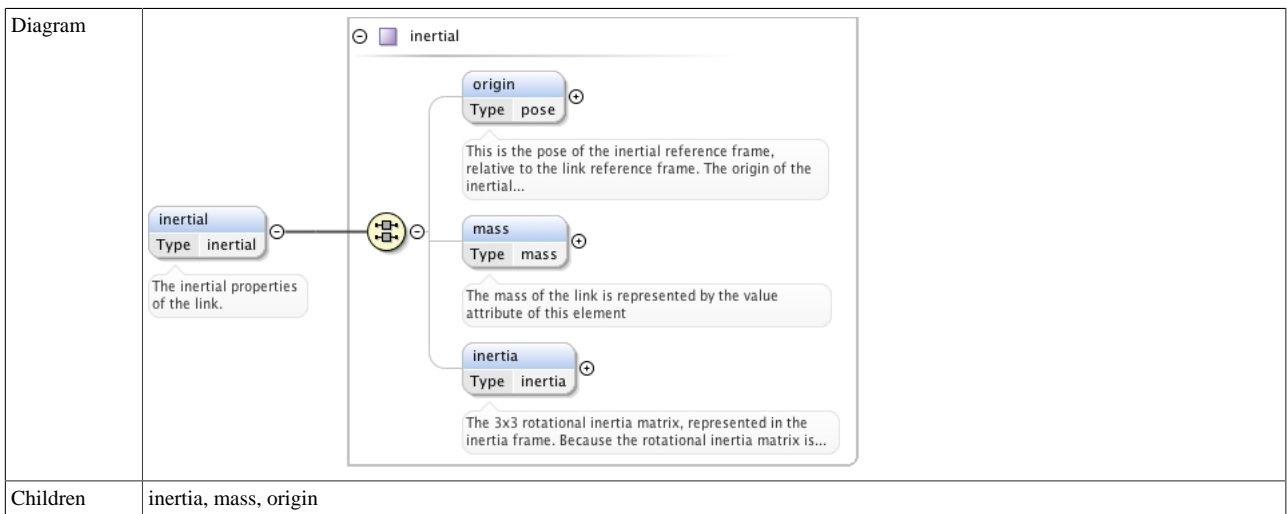
Diagram																
Attributes	<table><tr><th>QName</th><th>Type</th><th>Default</th><th>Use</th><th></th></tr><tr><td>rpy</td><td>xs:string</td><td>0 0 0</td><td>optional</td><td></td></tr><tr><td></td><td colspan="4">Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.</td></tr></table>	QName	Type	Default	Use		rpy	xs:string	0 0 0	optional			Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.			
QName	Type	Default	Use													
rpy	xs:string	0 0 0	optional													
	Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.															

QName	Type	Default	Use	
xyz	xs:string	0 0 0	optional	
Represents the Cartesian offset				

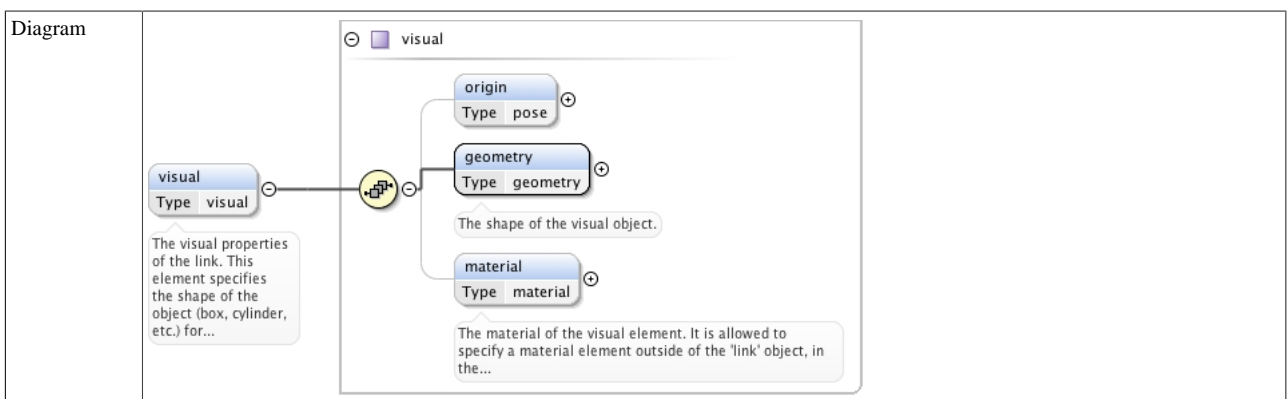
## Element collision / geometry



## Element link / inertial



## Element link / visual



Children	geometry, material, origin
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## Element link / collision

Diagram				
Children	geometry, origin			
Attributes	QName	Type	Use	
	name	xs:string	optional	

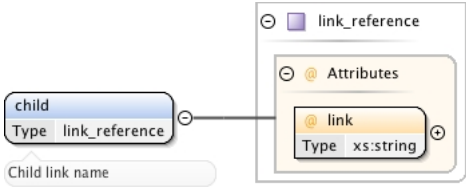
## Element joint / origin

Diagram				
Attributes	QName	Type	Default	Use
	rpy	xs:string	0 0 0	optional
		Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.		
	xyz	xs:string	0 0 0	optional
		Represents the Cartesian offset		

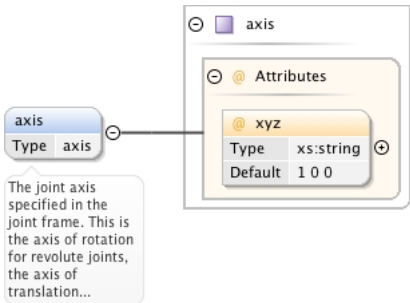
## Element joint / parent

Diagram				
Attributes	QName	Type	Use	
	link	xs:string	required	

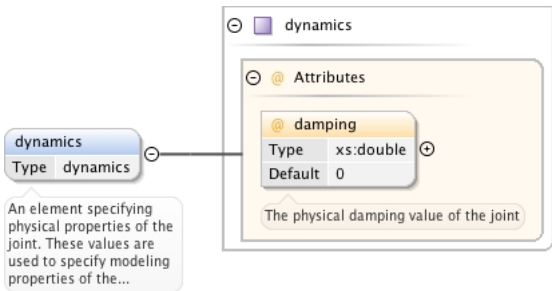
## Element joint / child

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>link</b>	xs:string	required	

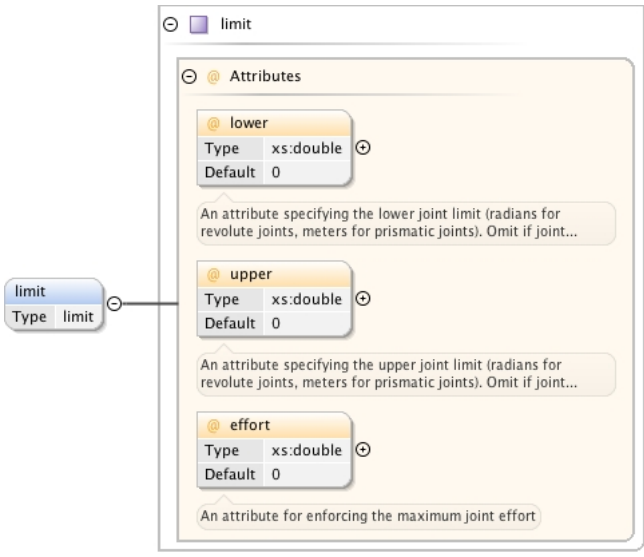
## Element joint / axis

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	<b>xyz</b>	xs:string	1 0 0	optional

## Element joint / dynamics

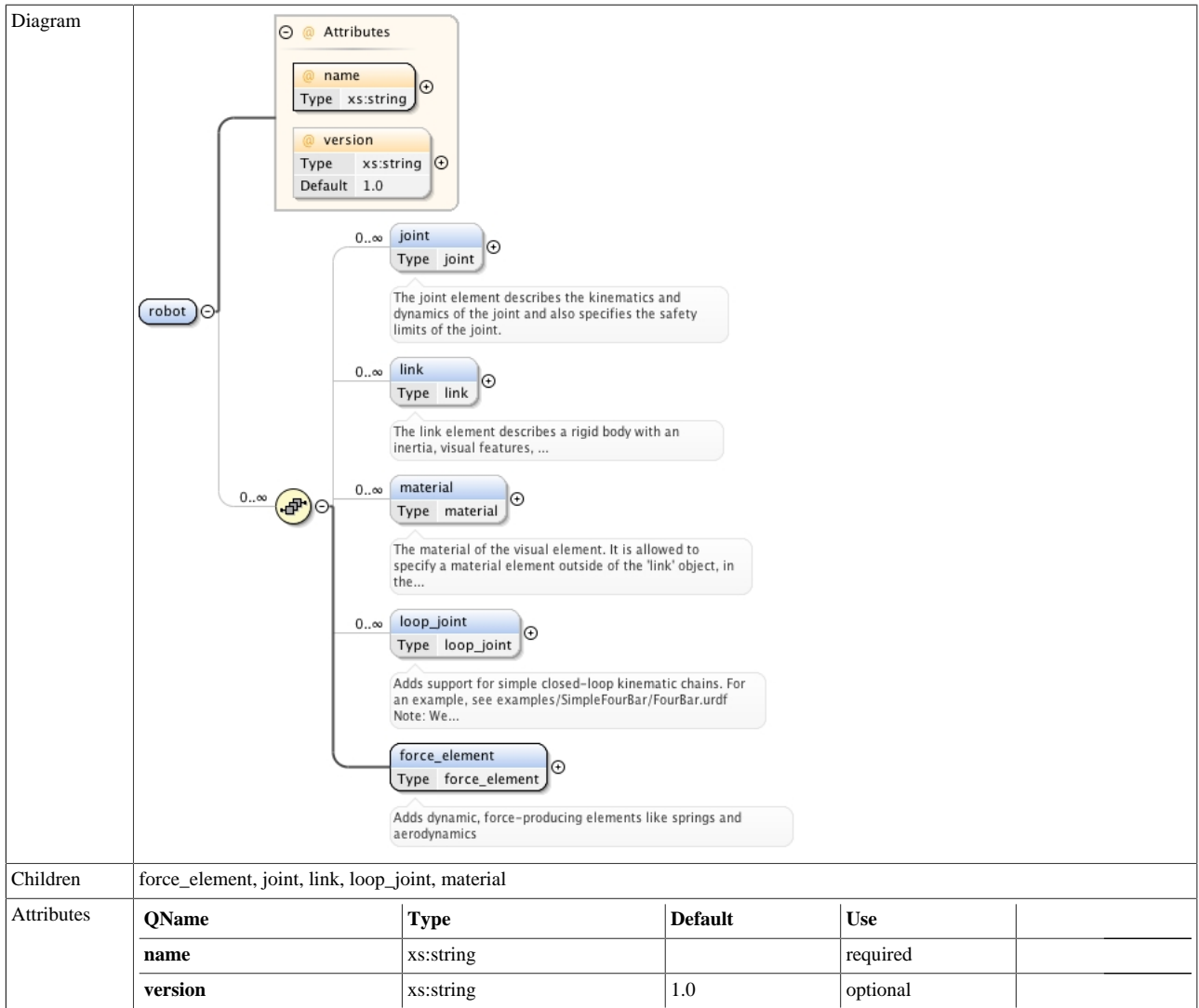
Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	<b>damping</b>	xs:double	0	optional
	The physical damping value of the joint			

Element joint / limit

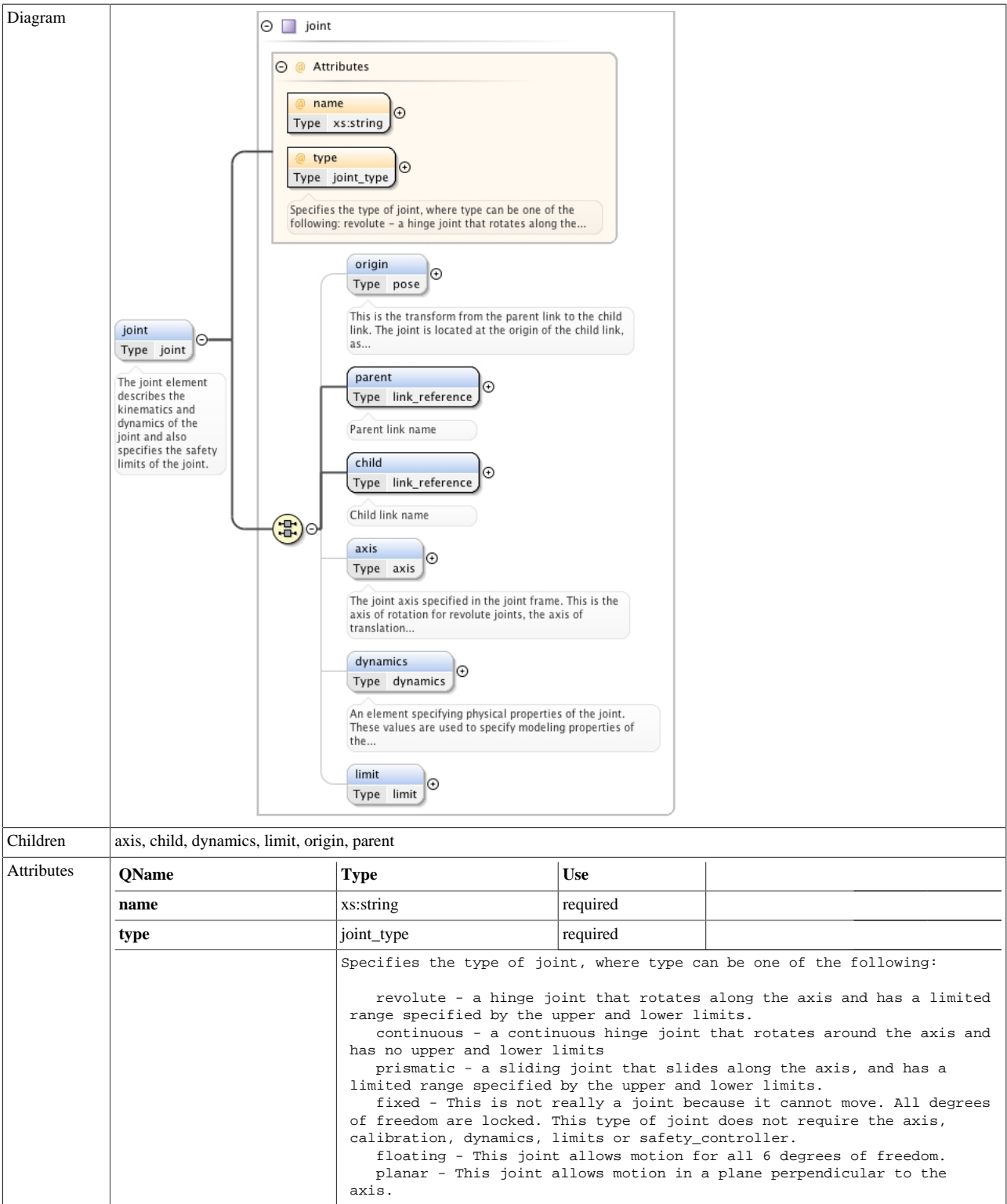
Diagram	 <p>The diagram illustrates the structure of the <code>limit</code> element. It features a main box titled <code>limit</code> containing an <code>Attributes</code> section. This section lists three attributes: <code>lower</code>, <code>upper</code>, and <code>effort</code>. Each attribute is shown with its type (<code>xs:double</code>) and default value (<code>0</code>). Descriptive text is provided for each attribute: <code>lower</code> and <code>upper</code> specify joint limits in radians or meters, while <code>effort</code> enforces maximum joint effort. A small icon on the left represents the <code>limit</code> element with its type.</p>				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	<b>effort</b>	xs:double	0	optional	
	An attribute for enforcing the maximum joint effort				
	<b>lower</b>	xs:double	0	optional	
	An attribute specifying the lower joint limit (radians for revolute joints, meters for prismatic joints). Omit if joint is continuous.				
	<b>upper</b>	xs:double	0	optional	
	An attribute specifying the upper joint limit (radians for revolute joints, meters for prismatic joints). Omit if joint is continuous.				



## Element robot



## Element robot / joint



## Element robot / link

Diagram				
Children	collision, inertial, visual			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>name</b>	xs:string	required	
		The name of the link itself		

## Element robot / material

Diagram				
Children	color			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>name</b>	xs:string	optional	

## Element robot / loop\_joint

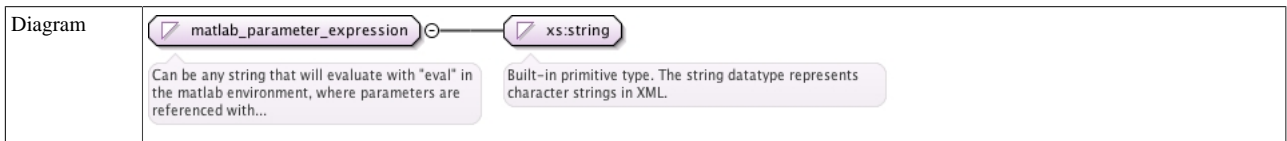
Diagram	<p>Diagram illustrating the structure of the <code>loop_joint</code> element. The element has two attributes: <code>name</code> (Type: <code>xs:string</code>) and <code>type</code> (Type: <code>xs:string</code>, Fixed: <code>continuous</code>). A note indicates that the <code>type</code> attribute currently must be 'continuous', but the intent is to eventually support all of the same types as a 'joint' element. The element has three children: <code>axis</code> (Type: <code>axis</code>), <code>link1</code> (Type: <code>link_reference</code>), and <code>link2</code> (Type: <code>link_reference</code>). A note for <code>link1</code> states: 'String naming the link on one side of the joint.' and a note for <code>link2</code> states: 'String naming the link on the other side of the joint.'</p>				
Children	axis, link1, link2				
Attributes	<b>QName</b>	<b>Type</b>	<b>Fixed</b>	<b>Use</b>	
	<b>name</b>	xs:string		required	
	<b>type</b>	xs:string	continuous	optional	
	Currently must be 'continuous'. The intent is to eventually support all of the same types as a 'joint' element. See the joint element documentation.				

## Element robot / force\_element

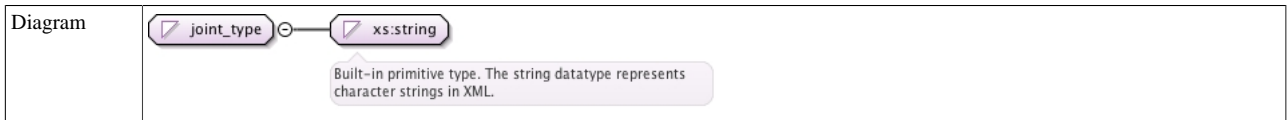
Diagram	<p>Diagram illustrating the structure of the <code>force_element</code> element. The element has one attribute: <code>name</code> (Type: <code>xs:string</code>). A note indicates that this element adds dynamic, force-producing elements like springs and aerodynamics. The element has three children: <code>linear_spring_damper</code> (Type: <code>linear_spring_damper</code>), <code>wing</code> (Type: <code>wing</code>), and <code>thrust</code> (Type: <code>thrust</code>). A note for <code>wing</code> states: 'See RigidBodyWing.m for more documentation'. A note for <code>thrust</code> states: 'Thrust elements produce a force on a point on the parent body in a specified direction. The magnitude of the force is...'.</p>				
Children	linear_spring_damper, thrust, wing				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	<b>name</b>	xs:string	optional		

## Simple Type(s)

### Simple Type `matlab_parameter_expression`

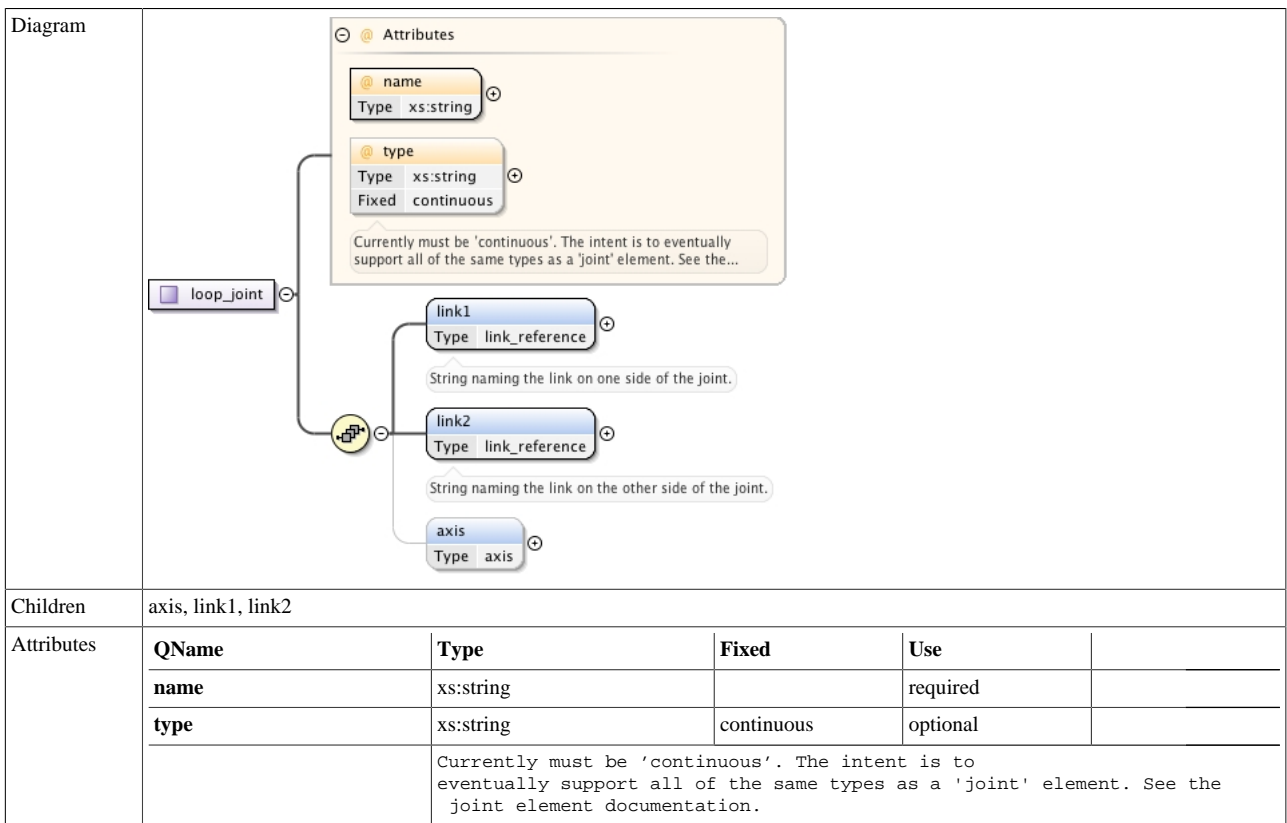


### Simple Type `joint_type`

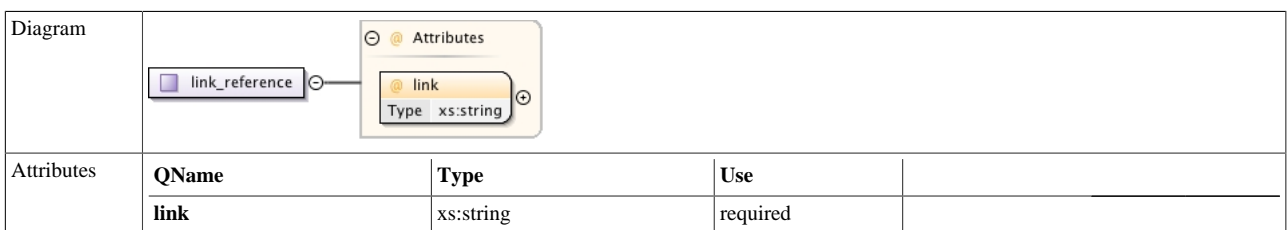


## Complex Type(s)

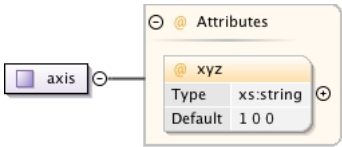
### Complex Type `loop_joint`



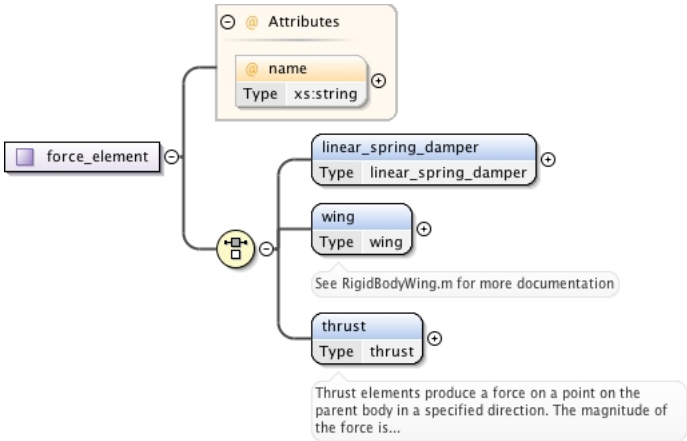
### Complex Type `link_reference`



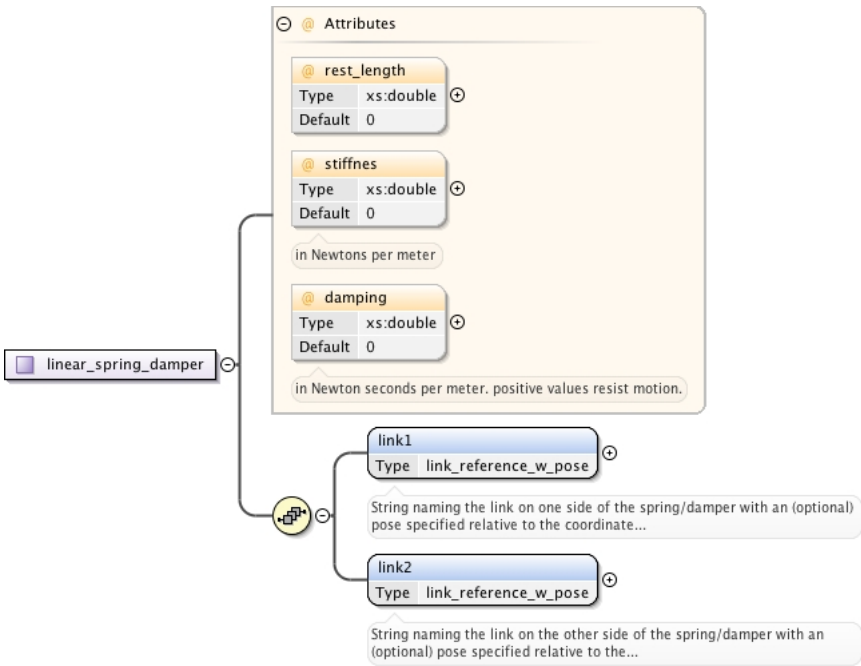
## Complex Type axis

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	xyz	xs:string	1 0 0	optional	

## Complex Type force\_element

Diagram					
Children	linear_spring_damper, thrust, wing				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>		
	name	xs:string	optional		

## Complex Type linear\_spring\_damper

Diagram					
Children	link1, link2				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	damping	xs:double	0	optional	

QName	Type	Default	Use	
	in Newton seconds per meter. positive values resist motion.			
<b>rest_length</b>	xs:double	0	optional	
<b>stiffnes</b>	xs:double	0	optional	
	in Newtons per meter			

## Complex Type link\_reference\_w\_pose

Diagram				
Children	origin			
Attributes	QName	Type	Use	
	<b>link</b>	xs:string	required	

## Complex Type pose

Diagram					
Attributes	QName	Type	Default	Use	
	rpy	xs:string	0 0 0	optional	
	Represents the fixed-axis (aka extrinsic) roll, pitch and yaw angles in radians.				
	xyz	xs:string	0 0 0	optional	
	Represents the Cartesian offset				

## Complex Type wing

Diagram	<p><b>Attributes</b></p> <ul style="list-style-type: none"> <li><b>profile</b> (Type: xs:string): one of the following strings: · The path to a .mat file that can be loaded and contains the three variables "CLSpline,..."</li> <li><b>chord</b> (Type: xs:double): the chord length in meters.</li> <li><b>span</b> (Type: xs:double): the span of the wing in meters.</li> <li><b>stall_angle</b> (Type: xs:double): the angle in degrees upon which the lift and drag performance returns to that of a flat plate. (this value is ignored...)</li> <li><b>nominal_speed</b> (Type: xs:double): an approximate nominal speed in meters per second used to calculate the Reynolds number around which we design the...</li> </ul> <p><b>link</b></p> <ul style="list-style-type: none"> <li><b>parent</b> (Type: link_reference): String naming the link on which this wing is attached.</li> <li><b>origin</b> (Type: pose): This defines the position of the quarter-chord point of the airfoil, since that is the reference point used for the...</li> </ul>			
Children	origin, parent			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>chord</b>	xs:double	optional	
		the chord length in meters.		
	<b>nominal_speed</b>	xs:double	optional	
		an approximate nominal speed in meters per second used to calculate the Reynolds number around which we design the aerodynamic coefficients.		
	<b>profile</b>	xs:string	optional	
		one of the following strings: <ul style="list-style-type: none"> <li>· The path to a .mat file that can be loaded and contains the three variables "CLSpline, CDSpline, CMSpline"</li> <li>· The string, 'flat plate'</li> </ul> 39 <ul style="list-style-type: none"> <li>· File location of a .dat file generated by Xfoil</li> <li>· A NACA airfoil designation: 'NACA0012'</li> </ul>		
	<b>span</b>	xs:double	optional	
		the span of the wing in meters.		
	<b>stall_angle</b>	xs:double	optional	
		the angle in degrees upon which the lift and drag performance returns to that of a flat plate. (this value is ignored if the profile is set to a flat plate).		



## Complex Type thrust

Diagram					
Children	origin, parent				
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	lower_limit	xs:double	-INF	optional	
	scale_factor	xs:double	1	optional	
	scales the dimensionless input to Newtons of force.				
	upper_limit	xs:double	INF	optional	

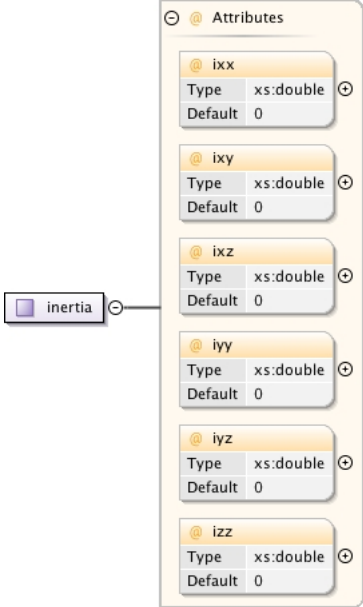
## Complex Type color

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	rgba	xs:string	0 0 0 0	optional	
	The color of a material specified by set of four numbers representing red/green/blue/alpha, each in the range of [0,1].				

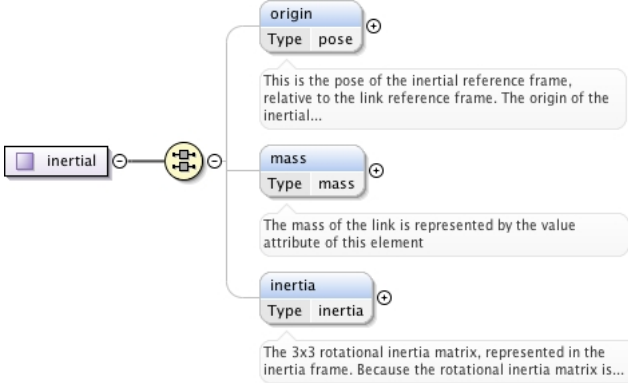
## Complex Type mass

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	value	xs:double	0	optional	

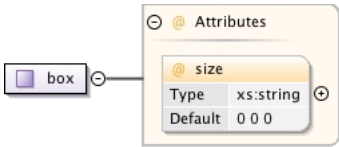
## Complex Type inertia

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	ixx	xs:double	0	optional	
	ixy	xs:double	0	optional	
	ixz	xs:double	0	optional	
	iyy	xs:double	0	optional	
	iyz	xs:double	0	optional	
	izz	xs:double	0	optional	

## Complex Type inertial

Diagram					
Children	inertia, mass, origin				

## Complex Type box

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	size	xs:string	0 0 0	optional	

## Complex Type cylinder

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	length	xs:double	required	
	radius	xs:double	required	

## Complex Type sphere

Diagram				
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	radius	xs:double	required	

## Complex Type mesh

Diagram					
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>	
	filename	xs:anyURI		required	
	scale	xs:string	1 1 1	optional	

## Complex Type geometry

Diagram					
Children	box, cylinder, mesh, sphere				

## Complex Type material1

Diagram				
Children	color			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	name	xs:string	optional	

## Complex Type visual1

Diagram				
Children	geometry, material, origin			

## Complex Type collision

Diagram				
Children	geometry, origin			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	name	xs:string	optional	

## Complex Type link

Diagram	<p>The diagram shows the structure of the <code>link</code> complex type. It consists of an optional attribute <code>name</code> of type <code>xs:string</code>, and three optional child elements: <code>inertial</code> (type <code>inertial</code>), <code>visual</code> (type <code>visual</code>, cardinality <code>0..∞</code>), and <code>collision</code> (type <code>collision</code>, cardinality <code>0..∞</code>). Descriptive text for each element is provided in callouts.</p>			
Children	collision, inertial, visual			
Attributes	<b>QName</b>	<b>Type</b>	<b>Use</b>	
	<b>name</b>	xs:string	required	
	The name of the link itself			

## Complex Type dynamics

Diagram	<p>The diagram shows the structure of the <code>dynamics</code> complex type. It consists of an optional attribute <code>damping</code> of type <code>xs:double</code> with a default value of 0. A descriptive text callout is provided for the attribute.</p>			
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	<b>damping</b>	xs:double	0	optional
	The physical damping value of the joint			

## Complex Type limit

Diagram	<p>The diagram shows the structure of the <code>limit</code> complex type. It consists of three optional attributes: <code>lower</code> (type <code>xs:double</code>, default 0), <code>upper</code> (type <code>xs:double</code>, default 0), and <code>effort</code> (type <code>xs:double</code>, default 0). Descriptive text callouts are provided for each attribute.</p>			
Attributes	<b>QName</b>	<b>Type</b>	<b>Default</b>	<b>Use</b>
	<b>effort</b>	xs:double	0	optional



**Attribute(s)**

Attribute link\_reference / @link  
Attribute axis / @xyz  
Attribute loop\_joint / @name  
Attribute loop\_joint / @type  
Attribute pose / @xyz  
Attribute pose / @rpy  
Attribute link\_reference\_w\_pose / @link  
Attribute linear\_spring\_damper / @rest\_length  
Attribute linear\_spring\_damper / @stiffnes  
Attribute linear\_spring\_damper / @damping  
Attribute wing / @profile  
Attribute wing / @chord  
Attribute wing / @span  
Attribute wing / @stall\_angle  
Attribute wing / @nominal\_speed  
Attribute thrust / @lower\_limit  
Attribute thrust / @upper\_limit  
Attribute thrust / @scale\_factor  
Attribute force\_element / @name  
Attribute color / @rgba  
Attribute mass / @value  
Attribute inertia / @ixx  
Attribute inertia / @ixy  
Attribute inertia / @ixz  
Attribute inertia / @iyy  
Attribute inertia / @iyz  
Attribute inertia / @izz  
Attribute box / @size  
Attribute cylinder / @radius  
Attribute cylinder / @length  
Attribute sphere / @radius  
Attribute mesh / @filename  
Attribute mesh / @scale  
Attribute material / @name  
Attribute collision / @name  
Attribute link / @name  
Attribute dynamics / @damping  
Attribute limit / @lower  
Attribute limit / @upper  
Attribute limit / @effort  
Attribute joint / @name  
Attribute joint / @type  
Attribute robot / @name  
Attribute robot / @version