Turtle commands in the language XL

Command	Description	GROGRA notation
F(x)	construct cylinder with length x	**F(x)**
F(x, d)	construct cylinder with length x and diameter d	**Dl(d) F(x)**
F(x, d, c)	construct cylinder with length x, diameter d and colour c	**Pl(c) Dl(d) F(x)**
F0	construct cylinder by using the length from the turtle state	**F**
FAdd(x)	construct cylinder with the length from the turtle state, incremented by x	**F+(x)**
FMul(x)	construct cylinder with the length from the turtle state, multiplied by x	**F*(x)**
M(x), M0, MAdd(x), Mmul(x)	same as for **F**, but movement only	**f(x), f, f+(x), f*(x)**
Mrel(q)	Movement to the relative position q on the axis of the **F**-cylinder generated before	**@(q)**
RU(a), RL(a), RH(a)	Rotation by *a* degrees around the local up, resp. left, resp. head axis	**RU(a),RL(a), RH(a)**
Plus(a), Minus(a)	Rotation by *a*, resp. –*a* degrees around the local up axis	(**\angle a,**...) **+, -**
AdjustLU	Rotation around the local head axis such that the local up axis points upwards as most as possible	**$**
RV(e), RV0, RVAdd(e), RVMul(e)	Gravitropism with strength given by *e*, resp. by the turtle state (cf. **F**)	**RV(e), RV, RV+(e), RV*(e)**
RG	maximal gravitropism, such that the local head axis points vertically down	**RG**
L(x), L0, LAdd(x), LMul(x)	Modification of the length in the turtle state: Set to x / to default value / increment by x / multiply by x	**L(x), L, L+(x), L*(x)**

Ll(x), LlAdd(x), LlMul(x)	Modification of the local length in the turtle state (this will be used for the next F0 only)	**Ll(x), Ll+(x), Ll*(x)**
same as for both last rows, but with **C**, **D**, **H**, **N**, **U**, **V** instead of **L**	Modification of the turtle state variables C content, diameter, diameter of heartwood, leaf parameter, number of internodes and strength of tropism	analog
P(c), P0, Pl(c)	Modification of the colour in the turtle state: set to c / to default value / set colour only for next F0 to c	**P(c), P, Pl(c)**
OR(x)	set the branching order in the turtle state to x	**OR(x)**
IncScale	increment the scale counter of the turtle state by 1	**/**
RD(v, e)	directional tropism in direction v with strength e	
RO(v, e)	directional tropism in the direction of the projection of the current direction of movement on a plane perpendicular to v with strength e	
RP(p, e)	position-controlled tropism towards position p with strength e	
RN(n, e)	position-controlled tropism towards the position of node n with strength e	
Translate(x, y, z)	Translation by (x, y, z), specification in global coordinates	
Rotate (x, y, z)	Rotation around the x axis by x degrees, around the y axis by y degrees, and then around the z axis by z degrees	
Scale(x, y, z)	Scaling along the x axis by x, etc.	
Scale(s)	uniform scaling by s	