**ALGORITHM DOCUMENTATION GUIDE**

Provide the required details using the following guide.

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| **Components** | **Details** | **Intructions** |
| Inputs | Theta, theta\_dot, x, x\_dot | Specify all the inputs, including coefficients if using any. |
| Fuzzy Rules | FAMM for angle:  IF theta is negtive large and theta\_dot is negtive large THEN push very large to left  IF theta is negtive large and theta\_dot is negtive small THEN push very large to left  IF theta is negtive large and theta\_dot is zero THEN push very large to left  IF theta is negtive large and theta\_dot is positive small THEN push large to left  IF theta is negtive large and theta\_dot is positive large THEN push do not push  IF theta is negtive small and theta\_dot is negtive large THEN push very large to left  IF theta is negtive small and theta\_dot is negtive small THEN push very large to left  IF theta is negtive small and theta\_dot is zero THEN push large to left  IF theta is negtive small and theta\_dot is positive small THEN push do not push  IF theta is negtive small and theta\_dot is positive large THEN push very large to right  IF theta is zero and theta\_dot is negtive large THEN push very large to left  IF theta is zero and theta\_dot is negtive small THEN push large to left  IF theta is zero and theta\_dot is zero THEN push do not push  IF theta is zero and theta\_dot is positive small THEN push very large to right  IF theta is zero and theta\_dot is positive large THEN push very large to right  IF theta is positive small and theta\_dot is negtive large THEN push large to left  IF theta is positive small and theta\_dot is negtive small THEN push do not push  IF theta is positive small and theta\_dot is zero THEN push very large to right  IF theta is positive small and theta\_dot is positive small THEN push very large to right  IF theta is positive small and theta\_dot is positive large THEN push very large to right  IF theta is positive large and theta\_dot is negtive large THEN push do not push  IF theta is positive large and theta\_dot is negtive small THEN push very large to right  IF theta is positive large and theta\_dot is zero THEN push very large to right  IF theta is positive large and theta\_dot is positive small THEN push very large to right  IF theta is positive large and theta\_dot is positive large THEN push very large to right  Famm for x:  IF x is negtive large and x\_dot is negtive large THEN push large to right  IF x is negtive large and x\_dot is negtive small THEN push large to right  IF x is negtive large and x\_dot is zero THEN push medium to right  IF x is negtive large and x\_dot is positive small THEN push slight to right  IF x is negtive large and x\_dot is positive large THEN push do not push  IF x is negtive small and x\_dot is negtive large THEN push large to right  IF x is negtive small and x\_dot is negtive small THEN push medium to right  IF x is negtive small and x\_dot is zero THEN push slight to right  IF x is negtive small and x\_dot is positive small THEN push do not push  IF x is negtive small and x\_dot is positive large THEN push slight to left  IF x is zero and x\_dot is negtive large THEN push medium to right  IF x is zero and x\_dot is negtive small THEN push slight to right  IF x is zero and x\_dot is zero THEN push do not push  IF x is zero and x\_dot is positive small THEN push slight to left  IF x is zero and x\_dot is positive large THEN push medium to left  IF x is positive small and x\_dot is negtive large THEN push slight to right  IF x is positive small and x\_dot is negtive small THEN push do not push  IF x is positive small and x\_dot is zero THEN push slight to left  IF x is positive small and x\_dot is positive small THEN push medium to left  IF x is positive small and x\_dot is positive large THEN push large to left  IF x is positive large and x\_dot is negtive large THEN push do not push  IF x is positive large and x\_dot is negtive small THEN push slight to left  IF x is positive large and x\_dot is zero THEN push medium to left  IF x is positive large and x\_dot is positive small THEN push large to left  IF x is positive large and x\_dot is positive large THEN push large to left | Specify all the fuzzy rules in the system. Indicate how many FAMMs are you using. Group the rules according to FAMMs. |
| Fuzzy Membership functions | input:x, nl, left\_trapezoid: a=-2.0, b=-1.8, c=0.0, d=0.0  input:x, ns, regular\_trapezoid: a=-2.0, b=-1.8, c=-0.8, d=0.0  input:x, ze, regular\_trapezoid: a=-0.6, b=0, c=0, d=0.6  input:x, ps, regular\_trapezoid: a=0, b=0.8, c=1.8, d=2.0  input:x, pl, right\_trapezoid: a=1.8, b=2.0, c=0.0, d=0.0  input:x\_dot, nl, left\_trapezoid: a=-2.0, b=-1.8, c=0.0, d=0.0  input:x\_dot, ns, regular\_trapezoid: a=-2.0, b=-1.8, c=-0.8, d=0.0  input:x\_dot, ze, regular\_trapezoid: a=-0.6, b=0, c=0, d=0.6  input:x\_dot, ps, regular\_trapezoid: a=0, b=0.8, c=1.8, d=2.0  input:x\_dot, pl, right\_trapezoid: a=1.8, b=2.0, c=0.0, d=0.0  input:theta, nl, left\_trapezoid: a=-2.0, b=-1.8, c=0.0, d=0.0  input:theta, ns, regular\_trapezoid: a=-2.0, b=-1.8, c=-0.8, d=0.0  input:theta, ze, regular\_trapezoid: a=-0.6, b=0, c=0, d=0.6  input:theta, ps, regular\_trapezoid: a=0, b=0.8, c=1.8, d=2.0  input:theta, pl, right\_trapezoid: a=1.8, b=2.0, c=0.0, d=0.0  input:theta\_dot, nl, left\_trapezoid: a=-2.0, b=-1.8, c=0.0, d=0.0  input:theta\_dot, ns, regular\_trapezoid: a=-2.0, b=-1.8, c=-0.8, d=0.0  input:theta\_dot, ze, regular\_trapezoid: a=-0.6, b=0, c=0, d=0.6  input:theta\_dot, ps, regular\_trapezoid: a=0, b=0.8, c=1.8, d=2.0  input:theta\_dot, pl, right\_trapezoid: a=1.8, b=2.0, c=0.0, d=0.0 | Specify all the parameters of all membership functions used for the all inputs. (e.g. input, type, name, a=?,b=?,c=?,d=?) |
| Defuzzification Method | Used the default one | Specify method used. |
| If using multiple FAMMs, specify integration method. | The two FAMMs are used separately during initialization, no integration method being used. | Specify details of integration method. |