The cross-sections of the macro vibrissae are tapered toward the tip and their lengths (160 - 220mm)

are approximately four times larger than the long whiskers of a typical adult

Rat.

the whisker base is mounted into a polyurethane rubber plug, a small magnet is bonded to the base of each whisker and a Hall effect sensor used to sample the displacements of the magnet in two directions

shorter (80mm) non-actuated whiskers (microvibrissae)

three degrees of freedom : elevation, pitch and yaw

The central computing resources

consist of a PC-104+ reconfigurable computing platform, composed of a single

board Computer and a closely coupled array of FPGAs for hardware accelerated

Processing.

I=(πr^4)/4

modulus of elasticity= 3.5 GPa to 7 GPa

diff\_eq = sp.Eq(sp.diff(E\*I\*sp.diff(y, x, x), x, x), -w)

d2/dx2 (EI(d2y/ dx2) )=−q(x) Where:

* (y) is the deflection of the beam,
* (x) is the position along the beam,
* (E) is the modulus of elasticity,
* (I) is the area moment of inertia of the beam's cross-section, and
* (q(x)) is the distributed load on the beam.

import sympy as sp

# Define the symbols

x, L, P, E, I = sp.symbols('x L P E I')

# Define the deflection function

y = sp.Function('y')(x)

# Define the distributed load

w = P

# Define the differential equation for the beam deflection

diff\_eq = sp.Eq(sp.diff(E\*I\*sp.diff(y, x, x), x, x), -w)

# Solve the differential equation

deflection = sp.dsolve(diff\_eq, y)

In this code:

x represents the position along the beam,

L is the length of the beam,

P is the distributed load on the beam,

E is the modulus of elasticity, and

I is the area moment of inertia of the beam's cross-sect