

Observed $\Delta\theta_{head}$

Error

Predicted $\Delta\theta_{head}$

y_{rot}

Predicting $\Delta\theta_{head}$ given d, ϕ_{az}

$\Delta\theta_{head}$ (degrees)	% of data
0	0.00
1	0.25
2	0.48
3	0.62
4	0.75
5	0.82
6	0.88
7	0.91
8	0.93
9	0.94
10	0.95

Diagram illustrating the distance from the predicted line given the head angle error. A robot head is shown with a vertical dashed line representing the predicted heading. The actual heading is indicated by a solid line, and the angle between them is $\Delta\theta_{head}$. The distance from the predicted line is labeled as "Distance from predicted line given $\Delta\theta_{head}$ ". The predicted line is shown as a dashed line, and the distance from the predicted line is labeled as "Distance from predicted line". The predicted line is also labeled as "Predicted positions for $\Delta\theta_{head}$ ". The distance from the predicted line is labeled as "Distance from predicted line given $\Delta\theta_{head}$ ". The predicted line is shown as a dashed line, and the distance from the predicted line is labeled as "Distance from predicted line". The predicted line is also labeled as "Predicted positions for $\Delta\theta_{head}$ ".

A line graph showing the percentage of data (Y-axis, 0 to 1) versus the distance from the predicted line in millimeters (X-axis, 0 to 0.5). The curve starts at (0,0) and rises steeply, then levels off, approaching 1.0 as distance increases to 0.5 mm.

Distance from predicted line (mm)	% of data
0.0	0.00
0.05	0.50
0.10	0.75
0.15	0.85
0.20	0.92
0.25	0.95
0.30	0.97
0.35	0.98
0.40	0.99
0.45	0.99
0.50	1.00

Figure 2 shows a 3D visualization of the head direction (HD) tuning of neurons in the dorsal raphe nucleus (DRN) of a freely moving mouse. The plot displays the HD tuning curves of individual neurons (colored lines) and their population average (black dots with arrows). The HD tuning is centered around a preferred direction (PD) of approximately 30 degrees. The error bar indicates the standard deviation of the PD, which is 3 degrees. A scale bar indicates 1 mm.