

The *participants overview XLSX* file regroups all anonymized participants data. Cells highlighted in orange indicate data excluded from the analyses based on the criteria outlined in the paper.

The *correlation matrices PDF* file includes correlation matrices for the perturbation group and the washout group.

The *experimental setup PDF* file contains screenshots of the task as performed in the virtual reality environment.

The *virtual reality results PDF* file presents outcomes from the virtual reality questionnaires on agency and cybersickness.

The *vmr simulation PDF* file provides a detailed presentation of the optimal feedback control simulation of a visuomotor rotation.

The *vmr simulation PY* file is a Python simulation of a visuomotor rotation based on optimal feedback control.

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The **<Raw data>** folder contains 33 subfolders, one for each participant, labeled **<P1>** to **<P33>**.

All participants (n=33) = **[P1:P33]**.

Perturbation group (n=28) = **[P3:P28, P31, P32]**.

Washout group (n=31) = **[P1:P3, P5:P11, P13:P33]**.

Each **<P>** subfolder contains 210 CSV files, labeled *P\_1* to *P\_210*, corresponding to each trial. (Note: the typical participant used to build Fig. 2 is *P3*).

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The **<Process data>** folder contains processed data to build figures.

*Figure\_2A.1* (cursor position and velocity in Fig. 2Ai, ii, iii, iv)

*Figure\_2A.2* (origine position, target position, peak velocity, time to peak velocity, position of peak velocity in Fig. 2Ai, ii, iii, iv)

*Figure\_3A* (all participants' (n=33) angle and length across the 210 trials, with *nan* values representing trials excluded based on the criteria detailed in the paper).

*Figure\_3A\_mean* (mean and SD for angle and length for each trial. Four files are generated, depending on the participants included in the calculation. The *mix\_groups* file contains combined data organized as follows: all participants (n=33) for the baseline cycle (trials 1 to 50), perturbation group (n=28) for the perturbation cycle (trials 51 to 130), washout group (n=31) for the washout cycle (trials 131 to 210). This organization ensures that the data reflects the participant groups relevant to each cycle).

*Figure\_3B* (participants' good trials proportion, angle and length a, b, c,  $R^2$ , for perturbation and washout cycles based on the exponential formulation detailed in the paper).