

EYE AND HAND TRACKING OF 2D PSEUDO-RANDOM TARGETS

G. Daunys, V. Laurutis, O. Spakov

Department of Radioengineering, Siauliai University, Vilniaus 141, Siauliai LT-5400, Lithuania

It has been generally accepted that predictive mechanisms have great influence on human motor tracking of a visual target. One commonly used predictable target is a small dot that repeatedly moves along a circular trajectory. The human eye can pursuit such a target with small lag or even with anticipation. The purpose of our study was to examine the dynamics of switching in predictive mechanisms of the brain during tracking tasks by eye or hand.

In our experiments, subjects pursued a target that was moving on a computer screen. Target trajectory was build from arcs of various radii. Their size corresponded to randomly chosen circular angles. The arcs were oriented in such a way that they can be smoothly joined to each other. Eye movements were recorded by video-oculography. Hand tracking was implemented using the computer mouse. Various tracking parameters, such as position error, velocity error, and velocity direction error were analyzed versus time and target velocity.

Experiment results revealed that eye angular position errors were lager than those for the hand if target velocity is small (2-5 °/s). However, hand position errors had bigger slope versus target velocity. If target velocity become >10 °/s, eye position errors become smaller. Eye movement direction always better corresponded to target motion direction. The time delay after a circuit arc was changed is about 2 times shorter in eye tracking.

The experimental results revealed preference of eye control system versus hand. The results enabled an improvement of an eye control system model.