Development of experimental-rig for human postural tremor behaviour

Abstract

The purpose of this study is to investigate the human hand tremor behaviour in postural condition considering experimental works performed on actual human hand and a developed rig which was specifically designed to induce vibration in an intra vernacular training (IVT) hand-arm model. Two DC motors were used to spin unbalanced masses as the source of excitation to the model. Thus, this produces vibration along the hand-arm model to emulate the behaviour of postural tremor phenomenon. The quantitative assessment of tremor of the hand-arm model was mainly measured and recorded using a light-weight accelerometer and a displacement laser sensor. The accelerometer converts the physical movement into acceleration signals while the laser displacement sensor was used for precise measurement due to their high sensitivity in motion. The latter transducer was directly targeted at the palm of the hand, adjacent to the location of the accelerometer. The displacement and acceleration signals were then examined in both time and frequency domains. The results from the experiment and simulation study can be used for further analysis of human hand-arm tremor (of typically a PD patient) and the development of anti-human arm tremor device that can eventually suppress the tremor.