Accurate Jitter Decomposition in High-Speed Links

Jitter performance plays a crucial role in bit-error -rate of a high-speed digital communication system. Jitter decomposition is a key tool to accurately derive each type of jitter as well as total jitter in a system and identify the root causes of jitter. In this thesis, we propose a jitter decomposition algorithm using least squares (LS) which simultaneously separates inter-symbol interference (ISI), random Jitter (RJ) and periodic Jitter (PJ). The algorithm includes a new time domain ISI model based on channel pulse response which is more effective than a conventional cursor convolution technique. The proposed jitter decomposition method is able to obtain the estimated individual jitter component value with great accuracy by using fewer samples of total jitter data compared with conventional methods. The simulation and hardware experiment demonstrate the efficiency and accuracy of the proposed method.