Problem Statement for Optimization

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Let us consider an array $x(n)$ of inputs $\{-1, 1\}$ of $n = 100$ elements is a training sequence vector. This input is transmitted through a system $h(n)$ which is a vector given as $h(n)$=[0.5 1 0.5] has length $M = 3$ and $z(n)$ is a vector of length 100 given as $z(n) = 0.5 * randn(1, 100)$.

Consider a system identification problem vector $h(n)$ as unknown vector we are trying to estimate, you have been given vector $x(n)$ and the observation $y(n)$ as

$$y(n) = \sum_{k=0}^{M-1} h(k)x(n-k) + z(n) \tag{1}$$

Apply an ML technique using linear regression or otherwise to learn the system model h.