Consider the following model
\[ Y_{i,n} = f(t_{i,n}) + \varepsilon_{i,n} \quad i = 1, \ldots, n, \]
where \( f \) is an unknown real function, defined on the interval \([0, 1]\) and \( 0 = t_{1,n} < \cdots < t_{n,n} = 1 \) is a fixed sampling on \([0, 1]\). The errors \( \varepsilon_{i,n} \) form a triangular array of independent random variables with zero mean and finite variance \( \sigma^2 \), such that for each \( n \), \( \varepsilon_{1,n}, \ldots, \varepsilon_{n,n} \) are independent. Our aim is to construct linear hypotheses tests on the regression function \( f \) in the case of a homoscedastic error structure. More precisely, let \( x_1(t), \ldots, x_p(t) \) linearly independent functions in \([0, 1]\) and let \( E_p \) be the vector space generated by \( x_1, \ldots, x_p \); we want to test the null hypothesis
\[ H_0 : \quad f \in E_p \quad \text{against} \quad H_1 : \quad f \notin E_p. \]
We use a test statistic based on the estimation of the minimal distance between the regression function \( f \) and the subspace \( E_p \) and show that it has a parametric asymptotic behavior. We give the asymptotic level and the asymptotic power of the test. In order to investigate the finite sample properties of the level of significance and the power, some simulation studies are conducted and compare it with other procedures in the literature.

Department of Mathematics, Mentouri University, Constantine, Algeria
E-mail address: z.mohdeb@gmail.com