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Weak Chebyshev subspaces and continuous selections for parametric projections. (English)

The existence of continuous selections for the parametric projection $P : (p, x) \mapsto P_{\Gamma(p)}(x)$ onto weak Chebyshev subspaces is examined in this paper. In particular, it is shown that if $S_{n,k}(p_1, p_2, \ldots, p_k) := \{ s \in C^{n-1}[a, b] : s|_{[p_i, p_{i+1}]} \in P_n \text{ for } i = 0, 1, 2, \ldots, k \}$ is the class of polynomial splines of degree $n$ with the $k$ fixed knots $a = p_0 < p_1 < \cdots < p_k < p_{k+1} = b$, then the parametric projection $P : (p, x) \mapsto P_{S_{n,k}(p)}(x)$ admits a continuous selection if and only if the number of knots does not exceed the degree of splines plus one.

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MSC:
41A15 Spline approximation
41A65 Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)
54C60 Set-valued maps in general topology
54C65 Selections in general topology

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