Weierstrass' theorem in weighted sobolev spaces with k derivatives.

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Abstract:

We characterize the set of functions which can be approximated by smooth functions and by polynomials with the norm

$$\|f\|_{W^{k,\infty}(w)} := \sum_{j=0}^{k} \|f^{(j)}\|_{L^{\infty}(w_j)},$$

for a wide range of (even non-bounded) weights w_j's. We allow a great deal of independence among the weights w_j's.