

# EXTENSION THEOREMS FOR CODES BETWEEN SHIFTS OF FINITE TYPE

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ABSTRACT. We consider the problem of extending sliding block codes between subshifts of finite type. For infinite-to-one codes, extending the result of Boyle and Tuncel, we show that if  $X$  and  $Y$  are irreducible shifts of finite type and  $Y$  is a lower entropy factor of  $X$ , then any code from a proper subshift of  $X$  to  $Y$ , which can be extended to a code on  $X$ , can be extended to a bi-continuing code of  $X$  onto  $Y$ . As for finite-to-one codes, the analogous statement fails and we are led to consider a weak version of extension problem. We investigate the bi-covering extensions of bi-resolving graph homomorphisms and show that every bi-closing code can sit in  $n$ -to-one codes between irreducible shifts of finite type for all large  $n$ .

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