

# Rationally induced composition operators on the half-plane

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## Abstract

Although more commonly considered on the disc, it is possible to construct spaces of analytic functions on any number of other domains, in particular, the half-plane serves as an interesting example. Although the Hardy spaces on the disc and half plane are equivalent, composition operators (namely operators formed by pre-composition with some self-map of the domain) behave very differently, in fact such operators on the half-plane belong to the wider class of weighted composition operators when transferred to the disc. Unlike the the unweighted case, such operators can be unbounded on the  $H^p$  spaces.

We consider the Hardy space  $H^2$  of the half plane, and look in particular at composition operators induced by rational mappings. As well as providing a characterisation of their boundedness, we look at an integral method for determining the adjoint of such an operator. Such a method was first explored by various authors in the case of the disc, but a number of problems were encountered, and the construction seems to live much more happily in this new setting.