

# Gorenstein flat preenvelopes

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**Abstract:** We consider a two sided noetherian ring  $R$  such that the character modules of Gorenstein injective left  $R$ -modules are Gorenstein flat right  $R$ -modules. We then prove that the class of Gorenstein flat right  $R$ -modules is preenveloping. We also show that over such a ring the class of Gorenstein flat complexes of right  $R$ -modules is preenveloping in  $\text{Ch}(R)$ . We also give examples of rings with the property that the character modules of Gorenstein injective modules are Gorenstein flat. We show that any two sided noetherian ring  $R$  of finite self injective dimension as a right  $R$ -module has the desired property. And we prove that if  $R$  is a two sided noetherian ring with a dualizing bimodule  $V$ , and such that  $R$  is left  $n$ -perfect for some positive integer  $n$ , then the character modules of Gorenstein injective modules are Gorenstein flat.