

NUMBER THEORY  
SEMINAR

*Eichler-Shimura theory for mock modular forms*

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**Abstract:** We use mock modular forms to compute generating functions for the critical values of modular L-functions, and we answer a generalized form of a question of Kohnen and Zagier by deriving the “extra relation” that is satisfied by even periods of weakly holomorphic cusp forms. To obtain these results we derive an Eichler-Shimura theory for weakly holomorphic modular forms and mock modular forms. This includes two “Eichler-Shimura isomorphisms”, a “multiplicity two” Hecke theory, a correspondence between mock modular periods and classical periods, and a “Haberland-type” formula which expresses Petersson’s inner product and a related antisymmetric inner product on weakly holomorphic modular forms in terms of periods.

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