Optimal Prepayment of Mortgages

John Chadam
Department of Mathematics, University of Pittsburgh

Abstract:
The optimal strategy for the prepayment of fixed rate mortgages is modeled mathematically as a free boundary problem for a parabolic PDE. Basic existence and uniqueness results are summarized. Non-linear integral equations are then developed for the location of the free boundary (the alternate investment rate below which the mortgage should be prepaid). They are used to derive a fast and accurate numerical scheme for calculating the early prepayment boundary. Finally, a simple, easily implemented analytic approximation for this boundary is obtained using asymptotic analysis. (Joint work with Xinfu Chen (Pittsburgh) and students Dejun Xie, Chris Jones)