A Radial Basis Function-based Partition of Unity (PU) Method For Solving Fixed-Rate Mortgages Model

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One of the financial contracts is a mortgage where the borrower uses a risky asset like house (as collateral) and gains funds from a bank or a financial institution. The discounted value which should be paid as the future monthly payments is known by the mortgage value. In the case which is called Fixed Rate Mortgages (FRMs) the interest rate and the scheduled payments, the borrower has to pay, are constant within the life of the loan. The mathematical model to obtain the value of the contract is posed as a free boundary problem described by a Partial Differential Equation (PDE). Moreover, we have to rely on numerical techniques by using Radial Basis Function (RBF)-based Partition of Unity (PU) method adopted for the pricing of financial contracts. We solve a PDE in which the problem does not depend on the locations of the approximation nodes. Finally, numerical results to illustrate the performance of the numerical schemes are presented. Keywords: Radial Basis Function-based Partition of Unity (PU) approximation, Fixed Rate Mortgages, Option Pricing, Numerical Methods.

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