

# A Space Marching Finite Difference Algorithm For Valuing American Options \*

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## Abstract

We consider the problem of valuing American options written on assets that pay continuous dividends with unknown optimal exercise boundary. The numerical solution of the associated free boundary value problem is investigated. By applying the mollification procedure, a fully explicit space-marching finite difference scheme is developed. The consistency and stability analysis of this scheme is presented together with some computational examples of interest.

## Keywords

American call option; American put option; optimal exercise boundary; high contact condition; free-boundary value problem; Fourier transform; mollification; space-marching finite difference scheme;  $l^2$  error norm.

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