Abstract

We propose an efficient algorithm for approximating particular solutions of certain elliptic partial differential equations using truncated series of Chebyshev polynomials. In particular, we consider the Poisson and the Helmholtz equations. The approximation of the particular solution by truncated series of Chebyshev polynomials and the satisfaction of the differential equation lead to upper triangular block systems, each block being an upper triangular system. These systems can be solved efficiently by standard techniques. Several numerical examples are presented for each case.