Green's function for the Boundary Value Problem of a $2M$th-Order Linear Ordinary Differential Equation with Nonlocal Multipoint Boundary Conditions

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Abstract. This paper obtains the Green's function of the nonlocal multipoint boundary value problem for $(-1)^M(d/dx)^{2M}$ in the interval $(0,1)$. The boundary conditions are certain weighted nonlocal boundary conditions at multiple points where periodic and antiperiodic boundary conditions alternate. The obtained Green's function is derived from the Green's function for the clamped-edge boundary value problem and inherits the properties of the Green's function for clamped conditions. We also consider other properties of the Green's function, such as symmetry and jump conditions, in detail.