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UPPER AND LOWER SOLUTIONS METHOD FOR HIGHER ORDER DISCRETE BOUNDARY VALUE PROBLEMS

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Abstract. We shall offer sufficient conditions on the function $f(i,u_1,\cdots,u_{n-1})$, so that the higher order discrete boundary value problem

$$(BVP)\begin{cases}(E)\ \Delta^n u(i-1)+f(i,u(i),\Delta u(i),\cdots,\Delta^{n-2}u(i))=0 \text{ for } i\in[1,T+1] \text{ and } n\geqslant 2,\\ (BC)\begin{cases}\Delta^m u(0)=0,\ \ 0\leqslant m\leqslant n-3,\\ \alpha\Delta^{n-2}u(0)-\beta\Delta^{n-1}u(0)=0,\\ \gamma\Delta^{n-2}u(T+1)+\delta\Delta^{n-1}u(T+1)=0,\end{cases}\end{cases}$$

has at least one solution.

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