

# **Exact Closed Form Solution For Two Coupled Inhomogeneous First Order Difference Equations With Variable Coefficients**

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## **Abstract**

We present an exact closed form solution for any set of two coupled, homogeneous as well as inhomogeneous, first order, finite difference equations with variable coefficients. The solution is obtained by using the graph theoretic, discrete path formalism. The central parameters in the solution are the crossing index and the crossing number. The transition from an enumerative graph theoretic solution to a closed form combinatorial solution is made possible by an isomorphism in-between paths on the signal flow graph, and n-tuplets of binary numbers