

## A new approach to solving Sylvester's equation

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### Abstract

In order to solve the Sylvester equation  $AX - Xb = C$ , this work consists, on the one hand, in providing a generalization of the famous Fuglede theorem for a large class of bounded linear operators, which contains several already established classes, in particular the remarkable class of normal operators. On the other hand, in applying these results to the resolution of the Sylvester equations, for which we provide the necessary and sufficient conditions for the existence of the solutions as well as their explicit expressions.

**Keywords:** Fuglede-Putnam theorem ; Elementary operators ; Operators equations.

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