# Discrete iterations for computing generalized inverses of time-varying matrix

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We consider discrete-time iterative methods for computing inverse and pseudoinverse of time-varying matrices. These methods are obtained by discretizing corresponding ZNN (Zhang Neural Network) models. The proposed schemes incorporate scaled Hyperpower iterative methods as well as the Newton iteration in certain cases. We apply the general linear Multi-step method to obtain the general discretization rule. It comprises all previously proposed discretization schemes, including Euler and the Taylor-type difference rules. One particular rule, based on the 4th order Adams-Bashforth method, is proposed and numerically compared with other known iterative schemes. In addition, we propose the extension of the ZNN model for pseudoinverse computation of singular or rectangular matrices. Convergence properties of the continuous-time ZNN model in the case of the Moore-Penrose inverse and its discretization are also considered.

## References

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