

**Byrne, Charles**

**A unified treatment of some iterative algorithms in signal processing and image reconstruction.** (English) [Zbl 1051.65067](#)

*Inverse Probl.* 20, No. 1, 103-120 (2004).

The author gives a unified treatment of several well-known algorithms in signal processing and image reconstruction. These are special case of the Krasnoselskii-Mann iterative procedure [cf. *W. R. Mann*, *Proc. Am. Math. Soc.* 4, 506–510 (1953; [Zbl 0050.11603](#))] to finding fixed points of nonexpansive continuous operators on Hilbert space. They include the Gerchberg-Papoulis method [cf. *A. Papoulis*, *IEEE Trans. Circuits and Systems CAS-22*, No. 9, 735–742 (1975)] for bandlimited extrapolation, the SART algorithm of *A. Anderson* and *A. Kak* [Simultaneous algebraic reconstruction technique (SART): A superior implementation of the ART algorithm. *Ultrason. Imaging* 6, 81–94 (1984)], the Landweber and projected Landweber algorithm [cf. *L. Landweber*, *Am. J. Math.* 73, 615–624 (1951; [Zbl 0043.10602](#))], simultaneous and sequential methods for solving the convex feasibility problem, the ART and Cimmino methods [cf. *G. Cimmino*, *Ric. Sci. Progr. Tecn. Econom. Naz.* 1, 326–333 (1938; [Zbl 0018.41802](#))] for solving linear systems of equations, the CQ algorithm for solving the split feasibility problem and *Z. O. Dolidze's* procedure [*Ekonom. i Mat. Metody* 18, No. 5, 925–929 (1982)] for the variational inequality problem for monotone operators.

Reviewer: [Karel Najzar \(Praha\)](#)

**MSC:**

- [65J15](#) Numerical solutions to equations with nonlinear operators (do not use 65Hxx)
- [94A08](#) Image processing (compression, reconstruction, etc.) in information and communication theory
- [94A12](#) Signal theory (characterization, reconstruction, filtering, etc.)
- [47J25](#) Iterative procedures involving nonlinear operators
- [65K05](#) Numerical mathematical programming methods
- [90C25](#) Convex programming
- [65F10](#) Iterative numerical methods for linear systems

Cited in **1** Review  
Cited in **510** Documents

**Keywords:**

nonlinear operators; signal processing; image reconstruction, bandlimited extrapolation; convex feasibility problem; algorithms; Krasnoselskii-Mann iterative procedure; nonexpansive continuous operators; Hilbert space; Gerchberg-Papoulis method; SART algorithm; Landweber algorithm; variational inequality; monotone operators

**Full Text:** [DOI](#)