# Circular Radon transform

*V.V. Kotlyar* [1,2], *A.A. Kovalev*[1,2]
[1] *Image Processing Systems Institute of RAS*
[2] *Samara State Aerospace University*

***Abstract***

The paper considers an integral transformation called the Circular Radon Transform (CRT), which is a generalization of the Radon transform for the case when the integration is performed along a circle of a certain radius, not a straight line. The radius of the circle is the transform parameter. Expressions for the CRT of several specific functions are obtained. Formulae are derived for generating an object image when the object is shifted and scaled. An optical scheme for performing the CRT is provided.

*Keywords*: circular transform, radon, CRT, radius circle.

*Citation:* Kotlyar VV, Kovalev AA. Circular Radon transform. Computer Optics 2003; 25: 126-133.

Access full text (in Russian)

***References***

[1] Helgason S. The Radon transform. Boston, MA: Birkhauser; 1980.
[2] Deans SR. The Radon transform and some of its application. New York: Willey; 1982.
[3] Anger B, Portenier C. Radon integrals. Boston, MA: Birkhauser; 1992.
[4] Rann AG, Katsevich AI. The Radon transform and local tomography. Boca Raton: CRC Press; 1996.
[5] Ambs P, Lee SH, Tain Q, Fainmann Y. Optical implementation of the Hough transform by a matrix of holograms. Appl Opt 1986; 25(22): 4035-4045.
[6] Woodford P., Casasent D. High accuracy and fast new format optical Hough-transform. Optical Memory and Neural Networks 1997; 1: 1-16.
[7] Soifer VA, Kotlyar VV, Skidanov RV. Optical implementation of the Hough-Radon transform. Computer Optics 1997; 17: 143-144.
[8] Soroko LM. Mesooptics. Foundations and applications. Singapore: World Scientific; 1996.
[9] Prudnikov AP, Brychkov IA, Marichev OI. Integrals and series. Vol 2: Special functions. Amsterdam: Gordon and Breach Science Publishers; 1986.