

BLACK PRINTER UCR AND UCA

Kazuo Sayanagi*

ABSTRACT:

Theoretical considerations on black printer by using linear model which consists of Demichel relations and Neugebauer equations instead of color density model are discussed. Additivity of tone densities could be kept for small solid density region, but for higher density case, especially the case of black printer, additivity does not work anymore. We have, therefore, to move to the use of linear theory. As a result of additivity failure, UCA has to be applied in addition to ordinally UCR. The necessity of UCA is clearly explained by linear theory. Analytical expression of the result is given as $(a_i - a_k) (1 - a_k)$ by good approximation, where (a_i) is dot area of any color component and (a_k) is dot area of black ink. As seen in the relation, real needs are combination of UCR (subtraction) and UCA (multiplication). Skeleton black printer and moderate UCR are illustrated as approximation of the above result. Total amount of ink for black printer application is compared with three color reproduction. Variations of UCR and UCA for different dot designs in recent non-impact printing technologies are also discussed. Four steps of color information handling for better color reproduction: tone compression, calculation of three color dot areas, black printer, and adjustment for effective areas, are summarized as an example of linear theory in color reproduction.

This paper was not submitted for publication.

*Canon, Inc.