HALFTONE DITHER CELL WITH INTEGRATED PREFERRED COLOR MATCHING

Abstract of the Disclosure

Methods and apparatus generate, and use in printing, a dither matrix (110) that incorporates a vivid-response function (y, 11-12; 15-16), which follows a generally S-shaped response curve (11-12). Printing with this pregenerated dither cell is just as fast as with a conventional cell, but printed color has a slightly exaggerated vividness, more pleasing to most users than more-accurately reproduced color. Color printed with this curve (11-12) alone, however, is found unsatisfactorily dark; the invention also encompasses including in the overall response (15-16) another function (z[x], Fig.5) to lighten the colors—particularly at the low end of the brightness range. We define both functions as so-called "gamma functions", but with different arguments (x, y) and exponents (γ_1,γ_2), and construct the S-shaped curve as two separate sections (11, and Fig. 4B; vs. 12, and right end of Fig. 4C) blended at a generally central point (H, m). Preferably the argument of the first (low-brightness) section (11) is an expression ([x - s]/m) that is proportional to an input color signal (x); the function raises this argument to a power (γ_1) greater than unity (ideally 1.6). The second (high-brightness) section (12) of the first function is essentially a mirror image of the first, flipped over first upward and then to the "right" (i. e., in both steps toward higher brightness); and is defined by an equation closely analogous to the first but using a different argument ([h - x]/m) to measure the signal from the high end (h) of the input range, and subtracting the curve value from the maximum output F. The second gamma function has as its argument (y) the output value of the first, and an exponent (γ_2) smaller than one—ideally 0.6.

(Figure 6)