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Prosthetic Typography: Correcting presbyopic defocus by deconvolving visual objects

Reading glasses correct defocus in presbyopia by intercepting and altering light coming from objects to the eye. An alternative approach is to alter the objects themselves to pre-compensate for the anticipated effects of defocused imaging--i.e., cancelling contrast reductions by boosts in object contrast, and phase reversals by pre-reversals. Modern printing technology makes such operations feasible, and Fourier optical analysis dictates their exact form and expected consequences. Such analysis shows that the contrast-reduction component of presbyopic defocus cannot be effectively corrected by altering printed objects. However its phase component can always be pre-corrected, and this can greatly improve the legibility of printed characters.