

What is Colorfulness?

AT CONSTANT SATURATION/CHROMATICITY

Colorfulness \propto Brightness

AT CONSTANT BRIGHTNESS

Colorfulness \propto Saturation

OVERALL

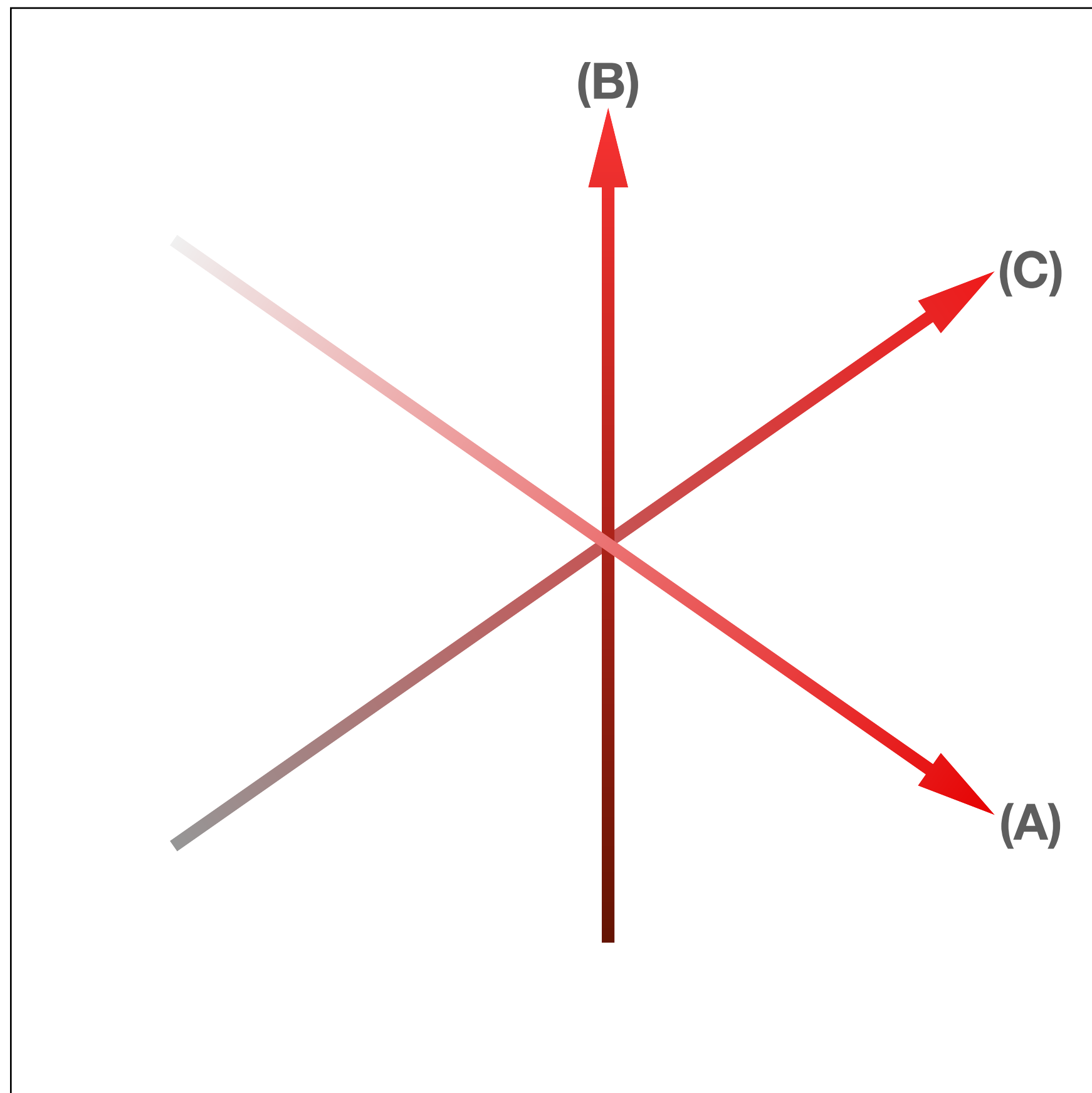
Colorfulness \propto Saturation \times Brightness

OR

Saturation \propto Colorfulness \div Brightness

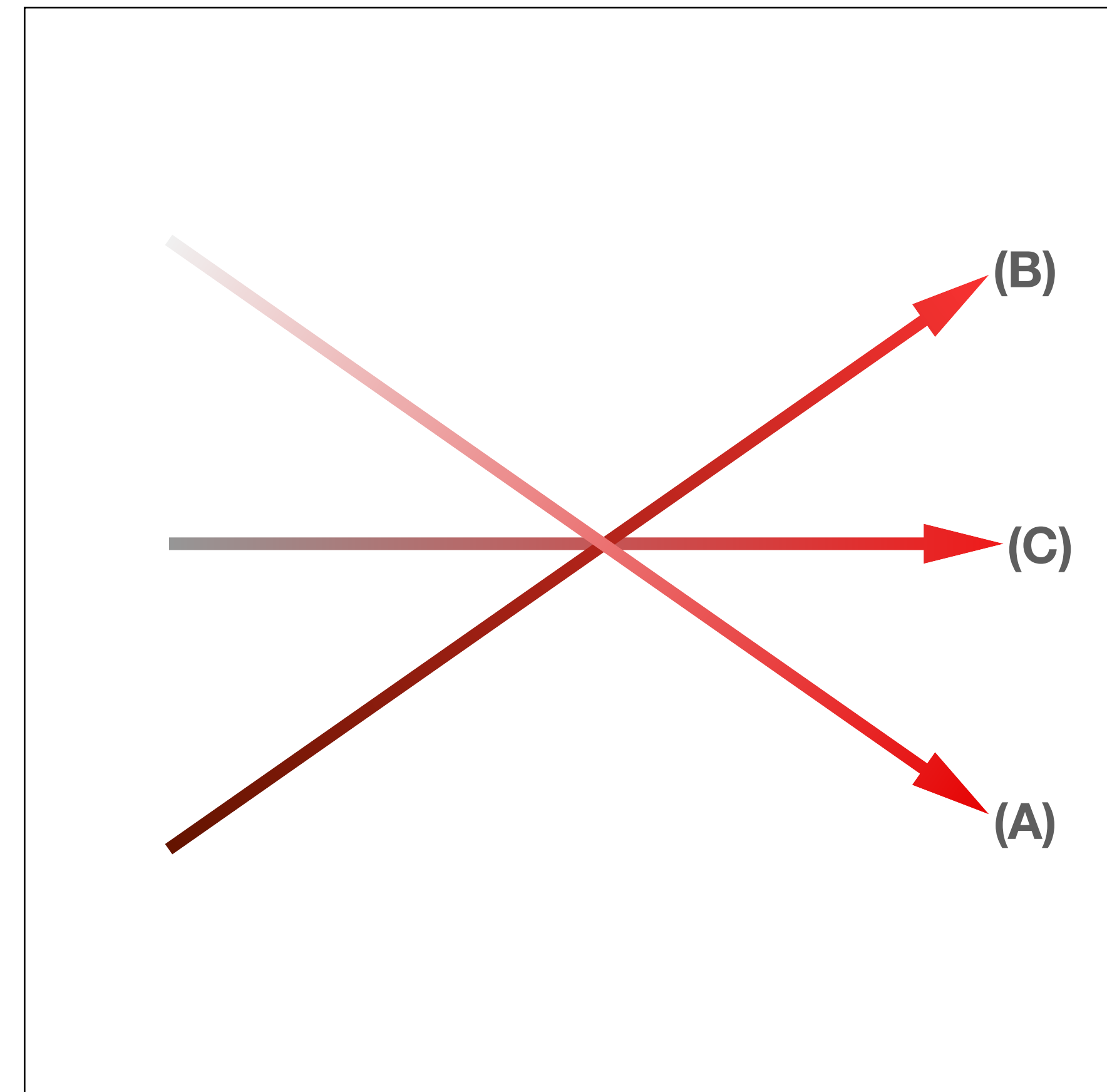
*This is true in perceptual theory and should be literally true in appearance models.
Colorfulness does not exist independent of saturation and brightness.*

Luminance Increasing



Excitation Purity Increasing

Luminance Increasing



Metric Chroma Increasing

(A) Constant Brightness, Increasing Saturation & Colorfulness (e.g. G0 Locus & HK Effect)
(B) Constant Saturation, Increasing Brightness & Colorfulness
(C) Increasing Brightness, Saturation, & Colorfulness