Monte carlo analysis of multicolour LED light engine

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A new Monte Carlo simulation as a tool for analysing colour feedback systems is presented here to analyse the colour uncertainties and achievable stability in a multicolour dynamic LED system. The Monte Carlo analysis presented here is based on an experimental investigation of a multicolour LED light engine designed for white tuneable studio lighting. The measured sensitivities to the various factors influencing the colour uncertainty for similar system are incorporated. The method aims to provide uncertainties in the achievable chromaticity coordinates as output over the tuneable range, e.g. expressed in correlated colour temperature (CCT) and chromaticity distance from Planckian locus (Duv), and colour rendering indices (CRIs) for that dynamic system. Data for the uncertainty in chromaticity is analysed in the u′, v′ (Uniform Chromaticity Scale Diagram) for light output by comparing the variations in chromaticity differences with the “n – step u′v′ circles” as defined in CIE TN001:2014.

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