Academy Spectral Similarity Index (SSI) Calculator User Guide

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The Academy Spectral Similarity Index (SSI) Calculator is a web-based tool for calculating the SSI value of a test illuminant when compared to a reference illuminant. Unlike most color indices, the SSI does not rely on the spectral sensitivity of human vision or of a particular camera. Instead, it compares how closely a test spectrum matches a reference spectrum; if there is a close match, there is a high confidence factor that the rendered colors using the test source will be close to those that would occur when using the reference source. Because of the comparison, the SSI value always includes in brackets what reference was used to calculate the value.

The spectral data – often called the Spectral Power Distribution (SPD) – is a table that gives the amplitude of the illuminant at each visible wavelength. The SPD is obtained using a spectroradiometer, spectrometer, or from a reliable source that has already done the measurement.

The test spectrum data is copied from an existing file and pasted into the tool in the "Test" column. If the "Reference Spectrum" is left in the "Default" setting, the tool will automatically choose the closest blackbody CCT spectrum for use as the reference illuminant. The resulting SSI value will be shown in the "Results" area. An example of this is shown in Figure 1.

Academy Spectral Similarity Index (SSI) Calculator (BET	A) Calculations About		
Test Spectrum	Data		
	Data		Plot
F1 A			
Fluorescent	Reference	Test	
F1	300 0.00033	300 0.00000	Spectral Power Distributions
F2	301 0.00245	301 0.00000	
F3	302 0.00581	302 0.00000	3.0 Reference [CCT=6427 K*]
F4	303 0.00979	303 0.00000	25
ES	304 0.01338	304 0.00000	
13	305 0.01602	305 0.00000	3 2.0
Fo	306 0.01788	306 0.00000	AD.
F7	307 0.01872	307 0.00000	<u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u>
F8	308 0.01996	308 0.00000	aut
F9	309 0.02385	309 0.00000	10 I.O
F10	310 0.03171	310 0.00000	
F11	311 0.04330	311 0.00000	0.5
F12	312 0.05880	312 0.00000	0.0
Custom	313 0.07693	313 0.00000	300 350 400 450 500 550 600 650 700 750 800 85
eustoni -	314 0.09560	314 0.00000	Wavelength (nm)
	315 0.11343	315 0.00000	
	316 0.13064	316 0.00000	
	317 0.14711	317 0.00000	Reculte
	318 0.16305	318 0.00000	Results
	319 0.17897	319 0.00000	
	320 0.19516	320 0.00000	
	321 0.21130	321 0.00000	Spectral Similarity Index Default Reference Spectrum Used
	322 0.22709	322 0.00000	
	323 0.24286	323 0.00000	SSI[D6427] = 75 CIE Daylight with CCT = 6427.5K
	324 0.25914	324 0.00000	
	325 0.27618	325 0.00000	NOTICE
	326 0.29386	326 0.00000	NOTICE: The Academy SSI Calculator is currently in beta tecting
	327 0.31240	327 0.00000	The requering son calculation is can remay in sector example. The calculator should not use the concilienced a reference implementation of the Spectral Similarity Index (SSI) as it may contain errors
	328 0.33042	328 0.00000	The calculated should not yet be considered at the entry entry labor of the special entities in the calculation of the special entry in the calculation of the calculation of the special entry in the calculation of the calculation of the special entry in the calculation of the calcu
	329 0.34578	329 0.00000	
	330 0.35721	330 0.00000	
	331 0.36493	331 0.00000	
	332 0.36878	332 0.00000	

Figure 1. Default Reference Spectrum Screen.

If "Daylight" is chosen as the Reference Spectrum, several of CIE standard daylight illuminants are available for use as the reference as shown in Figure 2. In general, the Reference Spectrum selection should be the type of daylight that is being imitated by the test source; this will typically be indicated by the manufacturer of the luminaire. Conversely, it is possible to select "CCT" and manually enter the blackbody CCT to be used as the Reference Spectrum. The intent is to use commonly-used CCT values as reference illuminants as opposed to arbitrary values – users of the tool will probably be looking for a luminaire that can be used as a substitute for another standard luminaire, or one that will match another luminaire.

Academy Spectral Similarity Index (SSI) Calculator (BET	A) Calculations About	i -	
Test Spectrum	Data		Plot
F1			
	Reference	Test	
Reference Spectrum	300 0.00019	300 0.00000	Spectral Power Distributions
interence opecition	301 0.00152	301 0.00000	
Daylight	302 0.00354	302 0.00000	5.0 Retermine [CL1=3000 K ⁻] Test [CL1=3000 K ⁻]
	303 0.00597	303 0.00000	2.5
and the second se	304 0.00834	304 0.00000	((
● CCT ◎ D50 ◎ D55 ◎ D65 ◎ D75	305 0.01036	305 0.00000	3 2.0
CCT	306 0.01211	306 0.00000	6.
	307 0.01351	307 0.00000	<u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u>
5000	308 0.01498	308 0.00000	aut in the second se
- Sector	309 0.01719	309 0.00000	PP 1.0
	310 0.02053	310 0.00000	05
	311 0.02493	311 0.00000	0.5
	312 0.03045	312 0.00000	0.0
	313 0.03671	313 0.00000	300 350 400 450 500 550 600 650 700 750 800 850
	314 0.04306	314 0.00000	Wavelength (nm)
	315 0.04911	315 0.00000	
	316 0.05492	316 0.00000	
	317 0.06045	317 0.00000	Results
	318 0.06588	318 0.00000	Results
	319 0.07155	319 0.00000	
	320 0.07769	320 0.00000	
	321 0.08417	321 0.00000	Spectral Similarity Index
	322 0.09094	322 0.00000	
	323 0.09795	323 0.00000	SSI[D5000] = 69
	324 0.10517	324 0.00000	
	325 0.11251	325 0.00000	NOTICE.
	326 0.11998	326 0.00000	NOTICE: The Academy SSI Calculator is currently in bota tection!
	327 0.12762	327 0.00000	The reaching are summaries to Uniterry in Decid (Esting). The calculator should not wet be considered a reference implementation of the Spectral Similarity Index (SSI) as it may contain erorrs.
	328 0.13505	328 0.00000	action of the special manners in the contract of the special manners in the cost of the interview of the special manners in the cost of the special manner
	329 0.14174	329 0.00000	
	330 0.14734	330 0.00000	
	331 0.15189	331 0.00000	
	332 0.15532	332 0.00000	

Figure 2. Daylight Reference Spectrum Screen.

If "Blackbody" is chosen as the Reference Spectrum, then it is possible to manually add the blackbody color temperature into the CCT setting as shown in Figure 3. Normally, this should be a commonly used reference value – e.g., 2700K for home lighting, 3200K for cinema lighting. Conversely, by selecting the "A" setting the tool will automatically select the CCT that will give the highest SSI score. (This is normally for informational purposes.) An example of this operation is shown in Figure 4.



Figure 3. Blackbody Reference Spectrum Screen.

Academy Spectral Similarity Index (SSI) Calculator (BETA) Calculations	About	
Test Spectrum	Data		
lest spectrum	Data		Plot
F1 •			
	Reference	Test	
Defense for the second	300 0.00930	300 0.00000	Spectral Power Distributions
Reference Spectrum	301 0.00968	301 0.00000	
Blackbody	302 0.01006	302 0.00000	3.0 Reference [CCT=2856 K*] Test [CCT=2856 K*]
	303 0.01045	303 0.00000	25
	304 0.01086	304 0.00000	
O CCT 💽 A	305 0.01128	305 0.00000	₹ 2.0
CCT.	306 0.01171	306 0.00000	A6s
cci	307 0.01216	307 0.00000	E 1.5
2848	308 0.01262	308 0.00000	aut
	309 0.01309	309 0.00000	
	310 0.01358	310 0.00000	
	311 0.01408	311 0.00000	0.3
	312 0.01459	312 0.00000	0.0
	313 0.01512	313 0.00000	300 350 400 450 500 550 600 650 700 750 800 850
	314 0.01566	314 0.00000	Wavelength (nm)
	315 0.01622	315 0.00000	
	316 0.01680	316 0.00000	
	317 0.01739	317 0.00000	Deculte
	318 0.01799	318 0.00000	Results
	319 0.01861	319 0.00000	
	320 0.01925	320 0.00000	
	321 0.01991	321 0.00000	Spectral Similarity Index
	322 0.02058	322 0.00000	
	323 0.02127	323 0.00000	SSI[P2848] = 32
	324 0.02197	324 0.00000	
	325 0.02270	325 0.00000	
	326 0.02344	326 0.00000	NOTICE:
	327 0.02420	327 0.00000	The advantum solic advantation is currently in beta testing: The advantum should not use be considered a reference implementation of the Spectral Similarity Lodey (S ^{CD} as it was contain access
	328 0.02498	328 0.00000	The carculator should not yet be considered a reference implementation or the spectral similarity index (SSI) as it may contain efforts.
	329 0.02578	329 0.00000	
	330 0.02660	330 0.00000	
	331 0.02744	331 0.00000	
	332 0.02829	332 0.00000	

Figure 4. Blackbody A Reference Spectrum Screen.

If the user has SPD values that are at a different wavelength spacing and range than the default used in the tool, it is possible to select a "Custom" Test Spectrum and then define the minimum wavelength, maximum wavelength, and the wavelength increments of the SPD data as shown in Figure 5. For example, if the measured SPD data is from 380nm to 680nm at 2nm increments, then by entering those values the Test Spectrum table will be reformatted to match those settings. It is then easy to copy and paste the data from the existing SPD file.



Figure 5. Custom Test Spectrum Screen.

About the Academy SSI Calculator (BETA)

Introduction

The Academy Spectral Similarity Index (SSI) Calculator has been written and is maintained by the Academy of Motion Picture Arts and Sciences. This tool implements the Academy Spectral Similarity Index (SSI) and is intended to be compliant with the SSI specification.

Source code can be found on Github.

For more information on the Academy Spectral Similarity Index please visit: <u>http://www.oscars.org/ssi</u>.

Software

This calculator was built using R, Shiny, Shiny Server Open Source and colorSpec. Current software versions :

- R version 3.5.2 (2018-12-20)
- Shiny 1.2.0
- Shiny Server v1.5.6.875
- colorSpec 0.7.4.1

The calculator source code was last updated on 2019-02-06 11:19:00 -0800. The git commit id of the current calculator code is de8370c.

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