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## Color Grading in Television Programs (Post-print)

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### Abstract

In the context of today's increasingly mature digital technology, digital program production has become commonplace, delivering enhanced audio-visual experiences to audiences. Among these developments, post-production color grading has been widely adopted in television programming, serving not only to compensate for deficiencies arising from pre-production filming and lighting conditions, but also to enhance program viewability, strengthen audience emotional immersion, and thereby elevate overall program quality.

### Full Text

## The Application of Color Grading in Television Programs

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**Abstract:** With the increasingly mature development of digital technology, digital program production has become commonplace, bringing audiences a higher quality audio-visual experience. Post-production color grading has been widely applied in television programs, as it not only compensates for deficiencies caused by pre-production filming and lighting factors but also enhances program viewership, strengthens audience emotional engagement, and thereby improves overall program quality.

**Keywords:** PR scope-based color grading; program production; color script

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In today's era of increasingly mature digital technology, digital program production is no longer unfamiliar, delivering higher-quality audio-visual enjoyment to audiences while simultaneously imposing greater demands on television production personnel. Among these demands, post-production color grading has become widely utilized in television programs. Color grading not only compensates for shortcomings arising from pre-production filming and lighting conditions but also enhances program appeal and artistry, increases audience emotional immersion, and strengthens viewership effectiveness.

For digital editing of television programs, Adobe Premiere Pro (hereinafter referred to as PR) has become a commonly employed video editing software. PR's color grading capabilities have matured considerably, with its scope functions and Lumetri Color correction tools meeting the demands of program production in terms of speed, convenience, and efficiency, thereby elevating program quality. If color grading preparations are incorporated early in the production of promotional videos and feature films—for instance, by using Log mode in digital cameras during filming to preserve more color information, and by classifying and managing colors according to the script during pre-production—the final work will achieve even more outstanding results.

**Television Program Color Classification:** Political and historical programs feature distinct colors, with historical programs tending toward darker tones; entertainment programs employ bright, cheerful colors; talk shows utilize softer colors with low contrast; and gala programs feature rich, vibrant colors with strong contrast and high saturation, typically controlled through lighting on-site, with any deficiencies addressed through post-production color grading.

## 1. Basic Color Grading Using PR Scopes

Using scopes for adjustment is essential because each display exhibits slight color variations, and reception terminals introduce significant uncertainty. Modern mobile phones, tablets, televisions, and LED screens all exhibit color deviations. Relying solely on visual identification for color adjustment prevents complete information display at playback terminals, easily resulting in color casts. Furthermore, scope-based grading avoids subjective dominance in extensive color correction work. Digital charts and numerical values eliminate 感性 factors, concretely revealing actual color deviations and providing a convenient and reliable alternative.

Additionally, post-production editing often incorporates substantial video footage to compensate for insufficient filming time and space. Due to varying sources and environments, this footage contains significant color discrepancies, requiring all clips to be adjusted within unified ranges for hue, grayscale, and saturation. Hue adjustment involves the red-orange-yellow-green-cyan-blue-purple spectrum, with corrections made when color casts are present. Saturation represents a color's purity, chroma, and vibrancy, while grayscale represents a color's lightness—the eye's perception of brightness levels.

For digital editing using PR scopes, PR includes waveform monitors, vectorscopes, and component scopes [Figure 1: see original paper]. Set the component scope type to RGB display. In both waveform and component scopes, the left-side values of 0-100 indicate brightness levels from low to high, while the right-side values of 0-255 indicate color purity ranges. The upper portion of the scope represents highlight regions, the middle portion represents mid-tone regions, and the lower portion represents shadow regions. The component scope displays the three RGB channels. Since red, green, and blue are the primary colors of light, when red exceeds the chart in the scope, it indicates red channel clipping and overexposure; the same principle applies to blue and green. The vectorscope primarily displays color saturation, with colors closer to the periphery indicating higher saturation. Understanding these fundamental principles enables practical operation. When examining raw footage captured by digital cameras, the material typically exhibits high color latitude, appearing dark with an overall grayish tone. Moreover, due to temporal, locational, and environmental variations during filming, each footage set displays different color discrepancies. To address this, open PR' s Lumetri Color for basic color correction—primary grading.

**Step 1:** When obtaining externally filmed footage, the color display typically exhibits high grayscale values, with insufficient highlight and shadow regions. Referencing the waveform (brightness) scope, which displays IRE values (brightness levels) from left to right in the video, where 0 represents pure black and 100 represents pure white vertically, adjust the chart display to fit within the 0-100 range as much as possible. Within this safe range, correspondingly adjust parameters in “Lumetri Color—Basic Correction” such as brightness, exposure, contrast, highlights, and shadows.

**Step 2:** Correct color casts by referencing the RGB display in the component scope. If a single color is excessively high (for example, red), displaying more color at the scope' s upper end, select the highlight center point in the color wheel and move it toward red' s complementary color to reduce red in the scope. If more color appears in the lower portion, select the shadow center point in the color wheel and move it toward the complementary color. For excessive mid-tone colors, adjust the color wheel' s mid-tone toward the complementary color until the three color values in the component scope align. Large-scale color adjustments can also be made through hue and temperature settings before fine-tuning.

**Step 3:** Reference the vectorscope, where the “R-G-B-Y-U-V” display resembles a color grading wheel, showing video hue and saturation information. The white circle line represents the broadcast-safe color range. Excessively saturated colors are clearly visible in the scope. Under normal circumstances, the white area in the vectorscope must not exceed the RGB frame; exceeding it indicates oversaturation in a particular color, requiring correction in the “Lumetri Color—Color Wheels” panel. The straight line beside the red hue in the vectorscope serves as the skin tone reference line. When correcting skin tones, use a mask to

isolate the skin tone area in the frame, then adjust the brightness of highlights, shadows, and mid-tones using the sliders on the left side of the color wheel, or use curves for large-scale adjustments.

Typically, footage shot outdoors by digital cameras in Log mode exhibits high color latitude, preserving more color information to facilitate post-production color adjustment of all footage according to the script's color tendencies. Through color grading, we can unleash creativity by sourcing material from mobile phones, video cameras, or DSLR cameras, compensating for defects during post-production editing to achieve color uniformity and ensure final product quality.

## 2. Controlling Color Emotion and Rhythm

Never underestimate the importance of color as a visual element. Audiences immediately notice color and generate emotional responses—for instance, orange evokes oranges, green conjures grass and trees, warm colors feel warm and passionate, while cool colors feel cool and cold. Red represents passion and danger, green symbolizes life. Red, orange, and yellow often remind people of the rising sun or burning flames, conveying warmth, while blue evokes the sky or ice and snow in shadows, creating a cold sensation. Green and purple produce neutral temperature sensations. Colored video 素材 evokes emotions, creates different psychological feelings, and conveys specific emotional connotations. Moreover, any color change exists not only within a single shot but also between shots and sequences. Variations in brightness, hue, saturation, and color schemes all shift correspondingly with the work's rhythmic undulations.

**Program Types and Color Characteristics:** Passionate programs feature bright colors with high saturation; emotional programs use high brightness with slightly lower saturation to create intimacy; historical programs employ lower brightness and saturation with similar hues to convey heaviness; rural-themed programs use distinct colors with high saturation.

**Step 1: Creating a Color Script.** Before emotional color grading, prepare by determining what mood to 赋予 the work, which will define the ranges for color brightness, saturation, and hue. Color presets should avoid linguistic communication; the practical method is creating a color script. Based on color complexity, use samples to indicate color combinations in grading, avoiding inaccurate verbal descriptions. For example, when describing purplish-red or sky-blue [Figure 2: see original paper], three purples and three blues are shown—any could be called “purplish-red” or “sky-blue,” some bluer, some redder, making accurate verbal color description nearly impossible. A color script using color system charts or samples can define a work's color tendencies without textual description. Color scripts can be simple or complex, showing color combinations across different scenes, plots, or shots.

Using color scripts requires understanding color environments. For instance, red typically evokes stimulation, passion, positivity, boldness, and power, as well as

solemnity, dignity, celebration, and happiness. Green, the color of grasslands and forests in nature, symbolizes eternal life, ideals, youth, safety, freshness, and peace, creating a cool sensation. Blue conveys remoteness, tranquility, emptiness, and coldness. With social development, an increasing number of materials influence color associations, making human color perception increasingly complex. For example, different historical periods produce different color responses, and color experiences vary across generations.

**Step 2: Adjusting the Work' s Overall Color Structure.** Based on the color script, add an adjustment layer above the edited video footage and use the Lumetri Color corrector to adjust the overall color, brightness, or saturation tendencies for the entire work, establishing a unified tonal foundation. This may involve only brightness and saturation adjustments. Common grading styles include: micro-film style with strong overall contrast, warm highlights and cool shadows; fresh, clean style with low overall saturation, warm and greenish tones; and promotional video style with correct white balance and neutral colors.

For rapid editing and grading, editors can use color presets [Figure 3: see original paper]. In Lumetri Color, locate the “Creative–Look” presets and select warm tone presets, cool tone presets, or other personalized color presets based on the project' s overall attributes. These presets adjust values for brightness, contrast, and color, serving as a reference and learning method for those new to color grading.

**Step 3: Color Management in the Work.** This involves not only adjusting overall color tendencies but also implementing changes between shots and sequences, providing variations in color contrast, brightness contrast, and saturation contrast according to emotional undulations. The method involves weakening the parameters of the overall adjustment layer and adding separate adjustment layers with color correction managers on different sequences and shot groups, creating different color brightness and saturation tendencies based on script emotions.

For example, within a color wheel, yellow is the brightest saturated color, followed by orange. Saturated red, green, and cyan appear as medium gray, while blue and purple are the darkest saturated colors. Pure yellow always captures audience attention first, not only because it is a pure color but also because it is the brightest. Pure blue always appears darker than pure yellow, but by adding white, pure blue' s brightness can be elevated to match yellow' s level.

Mastering color grading tools requires not only these theories but also continuous practice, analyzing the visual structures of various excellent works, seeking emotional resonance, and integrating it into one' s own creations. Adjusting the overall color structure of footage significantly impacts the work. As visual organs, human eyes are most affected by brightness and color. Human behavior is influenced by vision because it is often emotionally driven. This may explain why people from different regions, countries, ethnicities, and personalities share common color experiences. For instance, orange and yellow not only feel warm

but also symbolize decay. Emotional responses to color are not static; leveraging color principles and managing program tonalities can create extraordinary television works.

### 3. Detail Color Grading

To elevate a program to the next level requires detailed 刻画, namely detail color grading. This includes local color adjustments within a frame and individual color adjustments within a shot.

**Local Frame Color Grading** [Figure 4: see original paper] typically involves increasing brightness of main subjects or scenes, reducing brightness of areas outside the visual center, and adjusting local colors that don't match the main scene's color system. The method involves adding Lumetri Color to the footage, using the mask creation tool to select the area requiring adjustment, and performing color corrections. For moving video, use the mask path tool to track the footage, generating dynamic paths for brightness and hue adjustments within the color corrector to complete local grading.

**Individual Color Grading in Shots** [Figure 5: see original paper] is used in special effects footage, such as simulating autumn/winter scenes from summer footage or applying distinctive colors to scene objects in music videos. Access the "HSL Secondary" tool in Lumetri Color, use the selection tool to choose the color requiring adjustment, fine-tune it in S, H, and L, use the color/gray tool to check the selection range, and employ denoise and blur tools for fine adjustments to selected color areas. Adjust hue, highlight, and shadow colors of the selected area using color wheels.

Through detail color grading, effective adjustments can be made to work imperfections and change footage color attributes, providing tremendous imaginative space for creating visual works. Further color grading requires experience, understanding color principles and relationships between different colors, and continuously exploring methods through practice and operation. It also requires effective utilization of equipment and digital technology to achieve extraordinary visual works more efficiently and quickly.

Mature programs or television works should incorporate color management during pre-production recording to avoid unnecessary steps in post-production color correction.

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*Note: Figure translations are in progress. See original paper for figures.*

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