



## The Mathematics of John's Left Hand

**CAN A SINGLE GUITAR CHORD EXPLAIN A** songwriter's hidden process? Do mathematical formulas contribute to classic tunes? Here's an example from a song that shook America in 1964.

The bridge to the Beatles' "I Want To Hold Your Hand" fits the song in a familiar but fresh-sounding way. To understand why, we go back to the chords of the chorus, in the key of G: C, D, G, Em, C, D, G, with each chord lasting two beats (except for the final G). The bridge's chord progression is Dm7, G, C, Am, Dm7, G, C, with each chord lasting four beats. But a Dm7 can also be interpreted as an F chord with a D in the bass. Viewed that way, the chord progression of the bridge is F, G, C, Am, F, G, C, which is *exactly* the chord progression of the chorus (IV, V, I, VIIm, IV, V, I), moved up a fourth. What we're hearing is the application of two different mathematical transformations: one to move the chords up a fourth, and the second to double the duration of each chord.

Did John and Paul think about the mathematical transformations subconsciously while writing the song? I focused on John's left hand during a performance of the song on the *Ed Sullivan Show*. What I found was that unlike George, who played a Dm7 at the start of the bridge, John strummed an F chord. This clinched it: When writing the song, John must have been thinking at some level of the pure shifted sequence of chords. —Jason I. Brown



his days with Jimi close to his heart, as they were sacred to him. He had been to the mountaintop, and he rarely spilled his treasured experiences in words. Mitch was one of the first drummers to play a jazz style in a rock band—the original fusion drummer!—as one listen to "Third Stone from the Sun" proves. He inspires me every time I listen to Hendrix. He teaches me that it's not just about the guitar, it's about the majesty of the whole painting." —Jude Gold