The Guitar Controller's Guide to

Imitative Synthesis

Part 3: Tickling the Ivories

BY BILL PURSE

THIS ARTICLE WILL FOCUS ON imitative approaches to piano performance. The piano created quite a sensation when it was first introduced, as its invention introduced one of the first velocity sensitive keyboards, in sharp contrast to the harpsichord. The term piano is short for the full name Pianoforte which literally means soft-loud. The piano's importance in the world of electronic instrument manufacturing is that all of their products (synthesizers and ROM sample-playback modules) are judged first by the imitative sound quality of their piano patches. Guitarists have always had an attraction to the sound of the piano (George Van Eps even calls the guitar a "Lap Piano"). Now with a guitar controller we can go one step further, assimilating its timbre and pedaling techniques.

The modern piano's physical size varies in length from 5 to 9 feet; the longer the piano, the louder and more timbrally complex the sound. The first

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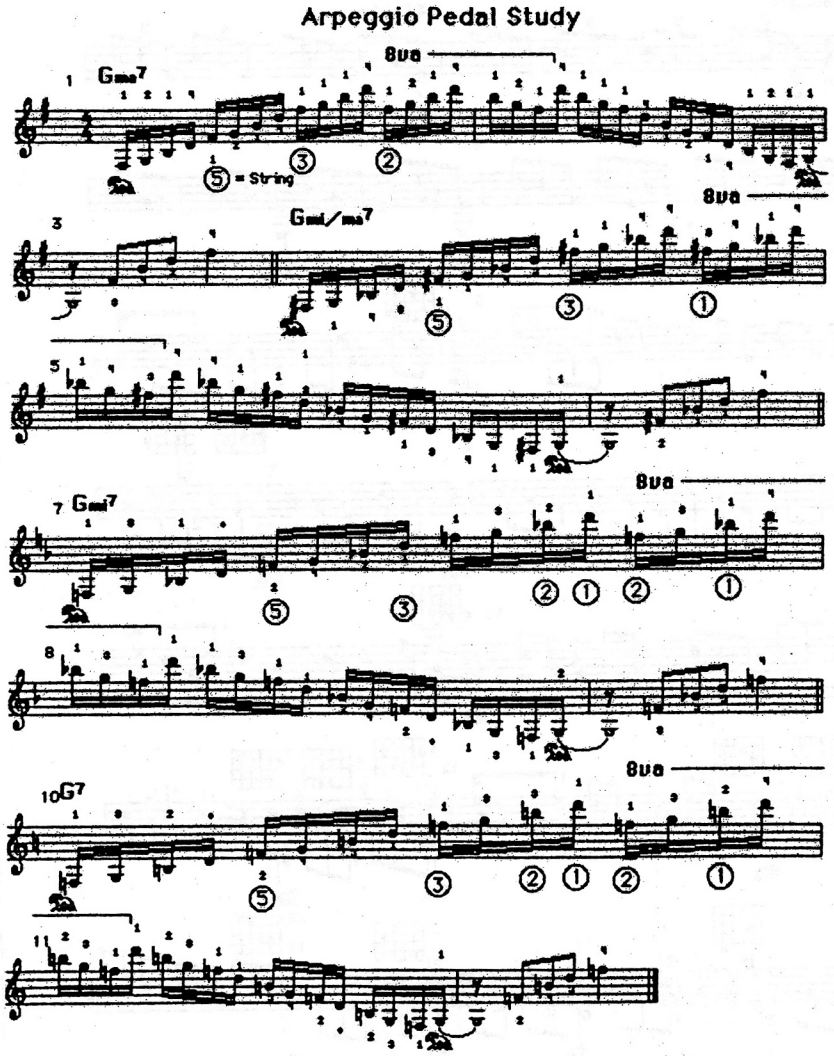
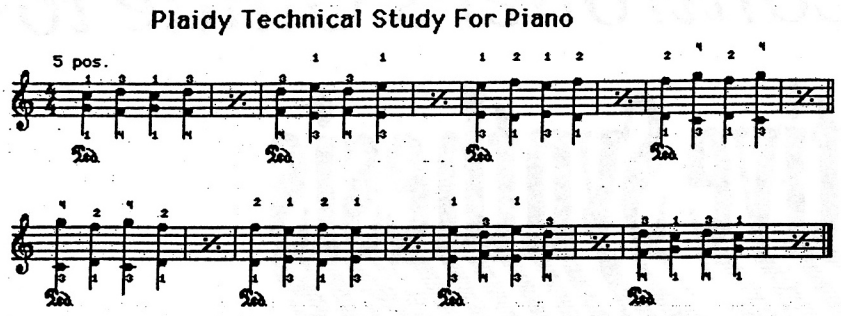
Exercise 1: Arpeggio Study Utilizing the Sustain Pedal

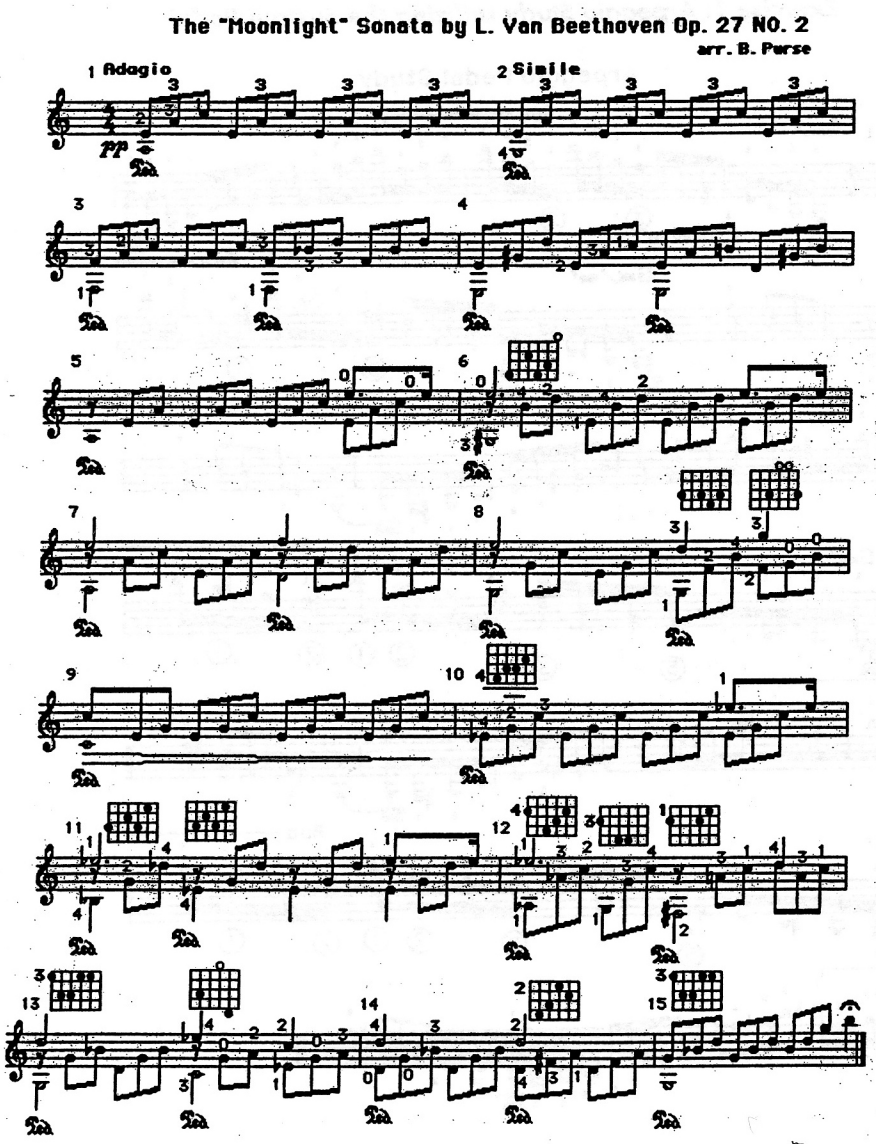


Exercise 2: Counterpoint and the Sustain Pedal



piano was introduced at the end of the 18th century and up to the introduction of electronic keyboards has remained the principal domestic keyboard instrument in Europe and America. Its range is quite extensive, covering the MIDI notes spanning #21 / A-1 to #120 / C8. This range can be spanned on guitar controllers by creating patches with different octave ranges. Commonly the lower two strings, the 6th and 5th, may be tuned an octave lower, or two alternate octave transpositions may be created an octave below or above standard pitch.

Exercise 3: Beethoven Excerpt, Moonlight Sonata



Pedal Points

Pedals are not new to guitarists, with a wide array of stomp boxes and pedal boards utilized as guitar's timbre modifiers, but it is quite a different matter to achieve musical results with a sustain pedal as opposed to the addition of a distortion or chorus pedal. By sustaining notes without having to maintain a finger on the fretboard, wide arpeggio glissandi can be executed, and can be the key to imitating piano performance techniques.

The physical nature of the piano's damping mechanism is to prevent unwanted strings from vibrating sympathetically. When a key is depressed its individual damper is lifted to let the string vibrate. After the key is released, its damper drops down onto the string to stop its vibrations.

This damping mechanism can also be moved away from all the strings by means of a pedal called the sustain or damper pedal. MIDI Continuous Controller 64 is defined as the *Hold* pedal, which implements this function. A value of 127 means the damper is off the strings, 0 puts it back on..

The leftmost pedal under the piano is called the Soft or Una Corda Pedal, which shifts the entire action of the piano so that the hammers strike only one string.

The other pedal of interest on the piano is the center one, called a *sostenuto* pedal. This pedal will only undampen the strings which are held down at the time the pedal is

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depressed; MIDI Controller ID Number 66 corresponds to this action.

The leftmost pedal under the piano is called the *Soft* or *Una Corda* Pedal, which shifts the entire action of the piano so that the hammers strike only one string instead of the two in the lower register, or two strings instead of the three normally employed for individual notes in the middle and upper registers. This lessens the overall volume and timbral complexity of notes played while the pedal is held down. The MIDI Controller ID Number 67 corresponds to the Soft Pedal.

(*Ed. note:* Unfortunately, it must be noted that the MIDI spec only *suggests* that these controllers be implemented as described here. In fact, few synthesizers come with all these functions pre–programmed, or even with the capability to implement anything other than standard *Hold*. It is to be hoped that in the General MIDI certification process—likely to become commonplace in the near future—care will be taken to standardize Continuous Controller implementations.)

If you have an assignable pedal option in your controller or an external footcontroller, you can assign these MIDI controller numbers to a pedal and experiment with them for musical interpretation or sequencer recording.

Pluckin' Piano

Here are some exercises which will create an opportunity for MIDI Guitarists to explore musical performance techniques and discover how to integrate MIDI pedal action into imitative performances of piano timbres. Timing is critical when releasing the tones which are sustained by the pedal and that this action must take place within a beat structure to be musical.

The exercises on pages 10 and 11 present a starting point for our exploration of piano imitative synthesis in future articles.

Thinkin' Piano

Observe pianists in action, whether in live performance or on videos. Is the role of the piano active or does it provide merely a sustained pad? The pad does not supply any rhythmic energy to the music but instead supplies a backdrop for active parts. Pads are usually in the middle range where the voicings are fullest or richest.

Does the piano's role change from one section to another? Listen to how the piano, drums, and bass interact or lock together when performing as an ensemble. Do they complement each other or are they working against each other? There are always opportunities to observe the piano in performance as it is an essential instrument in arranging and comping for all forms of music from pop to classical. So join me for a sampling of my next installment.

Bibliography:

Louis Plaidy Technical Studies For The Piano—arr. by Karl Klauser • 1903 G. Shirmer.

Harvard Dictionary of Music—Willi Apel • 1972 Belknap Press.

A Synthesist's Guide to Acoustic Instruments—Howard Massey • 1987 Amsco.