

Apply It.

The Math behind CDs AND ANTI-SKIP TECHNOLOGY...

Some technical terms used in Anti-skip Technology:

Error correcting codes, polynomial codes

Uses and Applications:

Making skip-proof portable CD players, making scratched CDs playable.

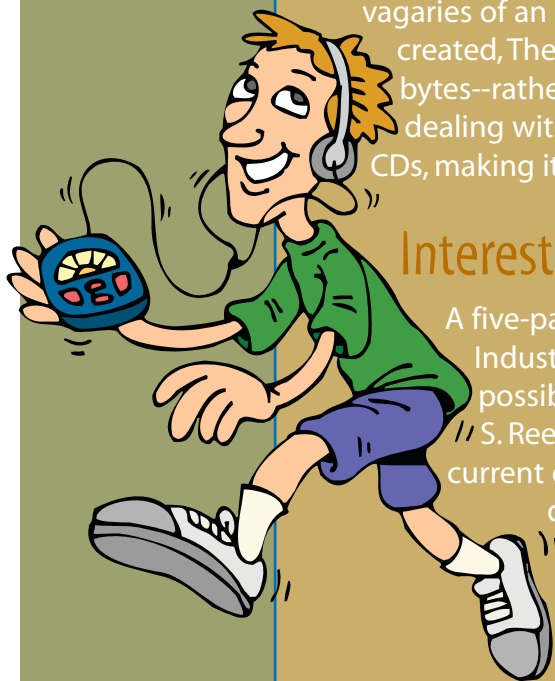
How it works:

Digital information consists of strings of "bits"--0s and 1s--which our modern listening devices (CD players) translate into something we understand (like music). These devices occasionally hiccup and confuse the 0s and 1s. Thus, error-correcting codes were developed and served as a kind of safety net --mathematical insurance against the vagaries of an imperfect material world. More recently, a new coding system was created, The Reed-Solomon codes, that was based on groups of bits--such as bytes--rather than individual 0s and 1s. These codes are particularly good at dealing with "bursts" of errors and are embedded (in the form of music) into our CDs, making it possible to scratch a compact disc and still enjoy the music.

Interesting Fact:

A five-page paper that appeared in 1960 in the Journal of the Society for Industrial and Applied Mathematics (that's us) made this technology possible. The paper, "Polynomial Codes over Certain Finite Fields," by Irving S. Reed and Gustave Solomon, introduced ideas that form the core of current error-correcting techniques for everything from computer hard disk drives to CD players. Reed-Solomon codes (plus a lot of engineering wizardry, of course) made possible the stunning pictures of the outer planets sent back by Voyager II.

(Thanks to the SIAM News Vol. 26, No. 1, January 1993, article by Barry Cipra, for the info above.)



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