The noise *n(t)* has a constant power density spectrum over the bandwidth of the message *m(t)*. The channel adds white noise of spectral height



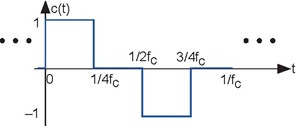
1. What would be the output of a traditional AM receiver tuned to the carrier frequency *fc*?
2. RU Electronics proposes to counteract jamming by using a diferent modulation scheme. The scheme's transmitted signal has the form



where *c(t)* is a periodic carrier signal (period



) having the indicated waveform ([Figure 6.33](#_bookmark487)). What is the spectrum of the transmitted signal with the proposed scheme? Assume the message bandwidth *W* is much less than the fundamental carrier frequency *fc*.

1. The jammer, unaware of the change, is transmitting with a carrier frequency of*fc*, while the receiver tunes a standard AM receiver to a harmonic of the carrier frequency. What is the signal-to-noise ratio of the receiver tuned to the harmonic having the largest power that does not contain the jammer?

**Figure 6.33**

**Problem 6.7**: Secret Communications

A system for hiding AM transmissions has the transmitter randomly switching between two carrier frequencies *f1* and *f2*. "Random switching" means that one carrier frequency is used for some period of time, switches to the other for some other period of time, back to the frst, etc. The receiver knows what the carrier frequencies are but not when carrier frequency switches occur. Consequently, the receiver must be designed to receive the transmissions regardless of which carrier frequency is used. Assume the message signal has bandwidth *W*. The channel adds white noise of spectral height



* 1. How diferent should the carrier frequencies be so that the message could be received?
  2. What receiver would you design?
  3. What signal-to-noise ratio for the demodulated signal does your receiver yield?

**Problem 6.8**: AM Stereo