

SG11

Using table 4 and the .80 probability of being correct what they cite on page 11, the following can be stated:

There are 32 possible 5-bit permutations for generated outputs. All 32 can be grouped with into a 0, 1, or 2 error message box with a .94208 reliability. (Some of the permutations fit into both 1 and 2 error boxes, and all of the 2 error entries ~~are redundant~~ match to both the (00000 and the 11011) or the (01110 and 10101) correct messages. That is, 2 error messages do not (as P&T suggest) uniquely identify a correct message, but only narrow the likely choices to 2.

Because of the 4 correct message codes they chose, several things happen. If a "correct" message is received, (e.g. 00000) then it must be remembered that ~~it also could be a~~ 3 error message of 01110 or 10101,

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a 4 error message of 11011. Since
 a 0 error message ($p = .32768$) is roughly
 6 times as likely as a 3 error message ($P = .0512$)
 and 50 times as likely as a 4 error message (.0064)
 then the 00000 choice is at least 6 times
 ($p \approx .82$) more likely than each of the other choices,
 but is only about 3 times ($p = .67$) [$.0512 + .0512$
 $+ .0064 = .1088$] more likely than all of the
 other messages. Most of the 1 error messages
 have even smaller odds of correlating to their
~~specific~~ uniquely identifying a specific correct
 message. For instance, the receipt of 00100 is
 (as shown in Table 4) a one error message of 00000.
 However, (not shown in Table 4) it also is a 2 error
 message of both 01110 and 10101. Since
 the odds of a two error message are $p = .2048$ and
~~there are two possibilities~~, the message 00100 gives
 only ~~an~~ an $\approx .5$ change of the message 00000
 (being either 01110 or 10101)
 being correct ($p = .4096$) relative to $p = .4096$ for $(.2048 + .2048)$

The statistics get hairy here, and I haven't tried to do them fully, but the curve for "no error correcting" is very wrong (see inserted green curve ~~for~~ on Table 4) and I would bet that the "error correcting" curve is also erroneously high. Hence, I am suspicious of the accuracy of the "majority vote" curve.


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00000
01110
10101
11011
0 1 1 1 1

$P_0(00000) = .00128$
 $P_1(01110) = .00512$
 $P_2(10101) = .02048$
 $P_3(11011) = .02048$

$P_c \approx .75$
 $\bar{z} = .02688$
 $\sim 3:9$

$P_0 = (.8)^5 = .32768$
 $P_1 = (.8)^4(.2) = .08192$
 $P_2 = (.8)^3(.2)^2 = .02048$
 $P_3 = (.8)^2(.2)^3 = .00512$
 $P_4 = (.8)^1(.2)^4 = .00128$
 $P_5 = (.2)^5 = .00036$

0 1 1 0 1

$P_3(00000) = .00512$ (12.5%)
 $P_2(01110) = .02048$ (37.5%)
 $P_2(10101) = .02048$ (37.5%)
 $P_3(11011) = .00512$ (12.5%)