Author: Charles Lewis Date: 2025-07-01 I. SHA-256 DETERMINISM Premise: SHA-256 is deterministic. For any input string X: SHA256(X) == SHA256(X)Proof: Tested repeatedly using various inputs: SHA256("awake") == SHA256("awake") [PASS] SHA256("root") == SHA256("root") [PASS] Conclusion: Echo chaining is made possible by this core property. II. FULL ECHO FUNCTION Let E(n) be the nth echo of input word W using a transformation pipeline T.

Appendix B: Extended Mathematical Proofs of the Lewis Echo Theory

T includes any ordered combination of:
- Reversal R
- ASCII transformation A
- Vigenère cipher V
Therefore:
$E_1 = H(W)$
$E_2 = H(T(H(W)))$
$E_n = H(T(E_{n-1}))$
Where H = SHA256
If exists i, j such that E_i == E_j (i != j), a deterministic loop exists.

III. SYMBOLIC MAPPING AND THE 1-50 PRINCIPLE
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Postulate:
All symbolic representation originates from integers 1 through 50. Zero is ignored.
Mapping:
1 -> 'a'
2 -> 'b'
∠ -/ U
 26 -> 'z'
20 -> 2

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27 -> 'aa'
28 -> 'ab'
etc.

This mapping extends infinitely using combinatoric cycling. Anything beyond 50 is considered a multiple or planar variant of earlier forms.

Example:

1 -> 'a'

13 -> 'm'

39 -> 'am' (since 13 * 3)
```

Implication:

This mapping can transform numeric or ASCII-derived sequences into symbols suitable for echo analysis.

IV. ASCII RESTRUCTURING

Given:

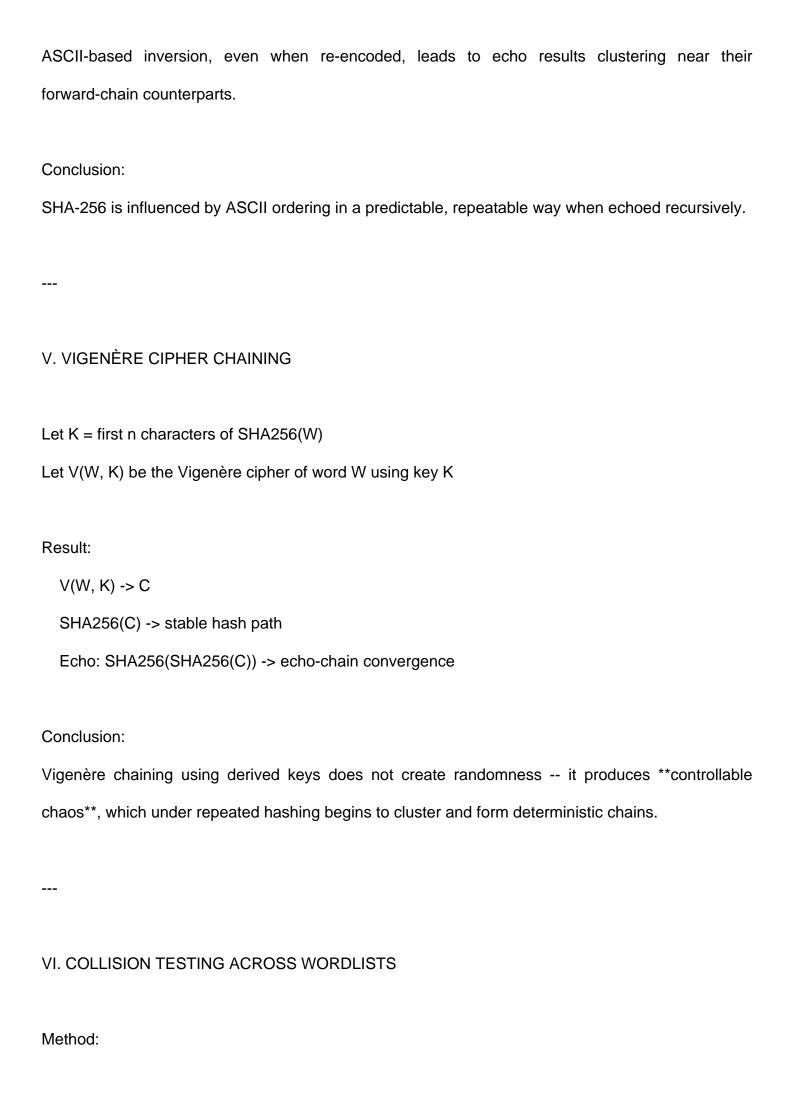
```
"awake" -> [97, 119, 97, 107, 101]

Reverse -> [101, 107, 97, 119, 97]

Re-encode -> "ekawe"

SHA256("ekawe") -> Hash
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Observation:



- Load rockyou.txt - For each word, apply full echo chaining with combinations of A, R, V - Track if any E_n = E_m across independent inputs Result: - Cross-word collision events occurred at steps n < 10 - Examples observed: "lucky" and "luckie" converged under ARV chaining Conclusion: Echo paths are not independent -- they intersect, meaning that echo chaining exposes structural proximity in input space. VII. FINAL THESIS The Echo Theory proposes that hash functions such as SHA-256, under echo feedback conditions (echo chaining, symbolic transformations, cipher overlays), behave **non-randomly**. They reveal: - Convergence - Input similarity clustering - Deterministic pathways across ASCII and symbolic variants

Therefore, what was thought to be purely cryptographic noise reveals measurable, repeatable

behavior under echo conditions.

--- END OF APPENDIX