

MATH 195: Gödel, Escher, and Bach (Spring 2001)
Notes and Study Questions for Tuesday, April 10 (part 2)

Aria with Diverse Variations

This dialogue is called "Variations" for a reason. See if you can detect how many variations there are on the themes in the dialogue. To do this, I suggest that you read this dialogue and then read it again to catch all the connections you missed the first time. You can hear Bach's version of the *Aria with Diverse Variations* by going to Additional Material for this unit.

22 SQ13. Connect the story of Count Kaiserling to various elements of the dialogue.

"1742? Hmm... That number rings a bell."
"It ought to... being the sum of two odd primes."

Perhaps 1742 the sum of two... rings a bell with you as well. You might recall the number theory example on p.204. What's with it with Hofstadter and his obsession with $17xx$, the sum of two...??? This mystery is finally solved, but not in a chapter that we'll cover this semester. If you're interested, I suggest you look ahead to p.551 and then pp.562-566.

Look very carefully at the two properties put forth: what's eventually called the Goldbach property, that an even number can be represented by the sum of two primes (p.393); and the Tortoise property, that an even number can be represented by the difference of two primes (p.395).

11 SQ14. Why is a search for a representation of 1 trillion as a sum of two primes GUARANTEED TO TERMINATE? Can one say that the procedure to decide whether a number has the Goldbach property definitely has a finite number of steps? (p.396)

44 SQ15. Why is a search for a representation of 1 trillion as a difference of two primes NOT GUARANTEED TO TERMINATE? Can one say that the procedure to decide whether a number has the Tortoise property definitely has a finite number of steps? (p.396)

33 SQ16. Is 3 a wondrous number? Don't guess. Do it. (p.401)

22 SQ17. What could it mean to subtract one from the diagonal of a list of names? Make a guess and try it. (p.404)

33 SQ18. Where does this dialogue end?