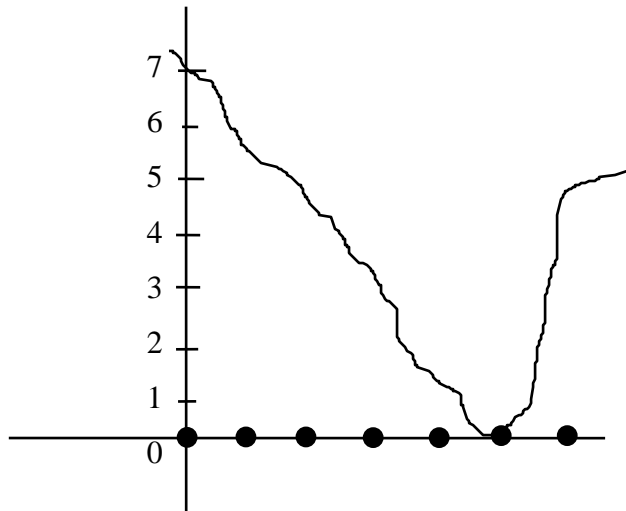


1. On the following figure the decisional values (0-7) of a quantiser are given.
  - a.) Draw the output of the quantiser for the drawn voice, if the samples are taken at the points marked by black circles, and the quantised (output) values are always in the middle of the decisional intervals!
  - b.) Can you give a modified characteristic that is better for noise suppression at low input values?
  - c.) Can you give a modified characteristic that has less decisional intervals but whose precision will be the same for the human's ear?



2. Describe the steps of the voice digitalisation
3. Describe the European (30+2 channel) PCM frame/multiframe system!
4. Describe the American (24 channel) PCM frame/multiframe system!
5. What are the open and closed numbering schemes? Compare them!
6. Describe the DTMF signalling!
7. How can we classify the telephony signals?
8. What is the task of the LAPD protocol? What are the frame types used in LAPD?  
What are the different frames used for?
9. How can a call be established with DSS1? (Message sequence)
10. What is the common channel signalling concept? (Description, advantages, disadvantages)
11. Draw the SS7 protocol stack! Explain the tasks of the different protocols briefly!
12. Describe the tasks of the 3 levels of MTP!
13. Draw the ISUP signal sequence of a successful call setup and release!
14. Draw the DSS1-ISUP-DSS1 signal sequence of a successful call setup and release!
15. How can LAPD correct transmission errors?
16. How can MT-2 correct transmission errors?
17. What are the functionalities of MTP-2?

18. What are the functionalities of MTP-3 SMH?

19 . We want to make an international call between country1 and network2 of country2. The switches involved in the call are marked by squares, the used voice circuits are thick continuous lines, the involved signalling (transfer) points are marked by circles and the used signalling links by thin dashed lines.

- Assign point codes to the S(T)Ps according to the point code formats used at the given places!
- Draw how the signalling connections are established! What are the most important parameters (DPC, OPC, NI, SI) of the messages? **Draw the solution on this paper!**

