

ELECTRONOTES

WEBNOTE 21

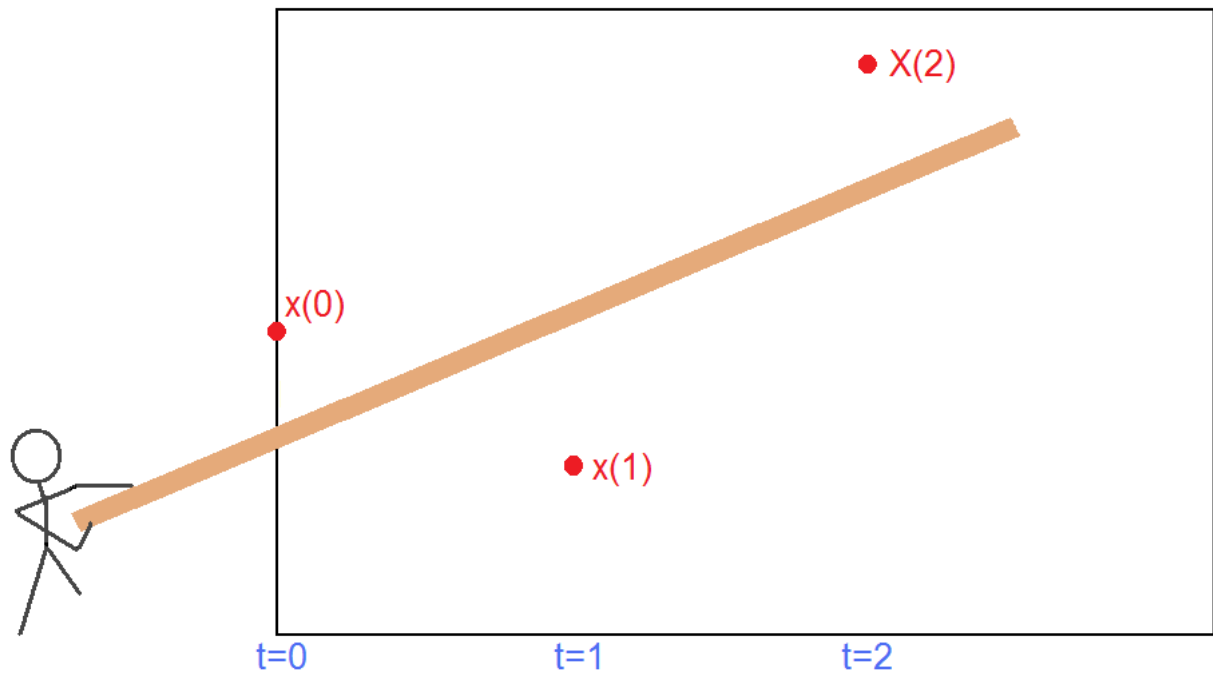
12/14/2014

ENWN-21

LASTING IMPRESSIONS - AND OTHER MEMORIES

In preparing the first figure for AN-418, the fitting of a straight line to three points, and suggesting the use of a ruler moving over the drawing, I was reminded of a lecture-room presentation of this same idea. This was done by my friend and colleague at Cornell, Tom Parks, famous for the Parks-McClellan algorithm. I had the honor and pleasure of teaching a senior-level DSP course with him for many years. This course was the descendent of a class I actually took back in 1971. Like most EE classes, it had evolved, perhaps mutating 20% each year. (More on this later.) In presenting the P-M algorithm, Tom would begin with the straight line fit to three points as a way of suggesting the “over-under” estimation leading to minimum max error. So he drew three points on the board and then when he wanted to discuss the straight line, he looked for a straight line in the room (like a wooden pointer, or a meter stick). Largely, this was a theatric, but an effective one. For many years the lecture was in a medium-sized classroom directly across from my office door, so I could easily run across and get the meter stick I had in my office. How handy. But the scheduling of classrooms is a very complex and complicated matter left to the university registrar. (More on this too later.) So sometimes we could be in a different building – not even on the engineering quad.

On one such occasion we were in a different building, and while the “host” department was always accommodating (as were we to all on campus), they did not have a straight line available in the lecture room. No pointer, and no meter stick across the hall. Having drawn three points, Tom looked about, and then left the room for the hallway and loading dock outside. When he returned, he had found a straight line. It was a 10 foot 2 x 4 piece of lumber – a bit oversized for his purpose! To the great amusement (and full attention) of the students, he managed to hold it up (poker-faced) to the board and illustrate the basic mechanism of the fitting (figure on next page). Probably everyone remembers that. When we were leaving, I said to him “You saw that 2 x 4 there when we came in – didn’t you?” He allowed that he might have seen it out of the corner of his eye.



The next point relates to the updating of courses year-by-year and the homogenization of departments across the university. Probably mainly because so much building space has been converted from classrooms/student-labs to sponsored research space, actual availability of classrooms can be at a premium. If individual departments all regulated (hoarded) their own space, accommodations would be less efficiently allotted. And to be fair, if a math dept. provides calculus to all incoming engineers, they could not offer enough rooms of their own – hence engineering provides recitation rooms. That sort of thing. The sharing system is imperfect, but is a great first approximation. So as I have said, while it was convenient to have a classroom right across from my office, at times, we had guests.

First of all, let's recognize that mixing up classes, students, and instructors across a university is largely good. At times, it would be suggested that we could be better organized by having the EE school spatially arranged by fields. That is, the signal processing folks would be in one cluster, the device physics folks in another, the power systems in yet another, and so on. Fortunately, that was too difficult to even define, let alone implement. Allowing other departments to use our building (and sometimes we got a room on the ag quad) was useful.

Like most college buildings, we had a major lecture room (hundreds), several lesser but still large rooms (approaching 100), and various small classrooms and seminar rooms. One of the middle-sized rooms was Phillips 219 which was right across from my office in 218. (The room for most of my time there was configured long with the lecturer in

the far north end. With renovation, it became wide with the lecturer on the middle east. Originally the door was almost always open – after renovation there was an automatic door closer.) The room as originally configured had a full width front counter/lectern, and the door was almost always open. My door was always open when I was at work.

So I had a view of the first three rows of students. Not unusually, one or more was asleep. At times they were clearly paying attention. Perhaps the coverage of an exam was being related by the instructor. Once a year, I could note the students sit up straight and lean forward with great concentration on the last days of classes for a term. If I didn't know, I figured out that Toby Berger was about to give his yearly harmonica recital to his class. A sweet ballad and then a jazzy jig. He is really good.

I think for two years there was a class in there by Prof. Joel Sibley of the History Dept. called "The Civil War and Reconstruction." His voice carried well. I really didn't mind at all - I could tune it out – or pay attention when I wanted to learn something interesting. His voice even made it around the corner to the administrative offices, and we used to joke - if we should not all just show up and take the final exam. When I walked the hallway, I could see Prof. Sibley, usually sitting on the front counter, just talking.

This caused me to think about how different what he did was from what I did. Engineering requires much more than just talking. We write equations and draw graphs (or sometimes used overhead slides and handed out copies of the figures so that we could go faster). Presumably today the students insist on fully downloadable PowerPoint! But Prof. Sibley just talked – I didn't even see that he used any notes. (In engineering, too often when you write down equations the students just copy them. Then when you stop writing, likely to explain what it means, they tune out!) It occurred to me that he didn't need notes because his material was invariant with time. History! At the same time, I was involved with the "same course" since 1971 and it had changed immensely. When I took it in 1971, it was passive analog filters and some active filters. There was an inchoate DSP "seminar" follow-up at that time. Eventually when I became involved with teaching the course it became half active filtering and half DSP. By 1990, it was all DSP. And the topics advanced as the field advanced. During an ABET review (outside formal evaluation for accreditation) one reviewer asked what instructors did to keep up and learn the new advances in the field. Tom Parks answered that we just teach a course in the new topic. Excellent answer – jump right in.

Now, before I forget, it did occur to me that my history professor colleague faced a different situation. The year-by-year reiteration in part allowed the development of a very refined and agreeable presentation – unlike our fumbling around – and getting the students to bail us out. And historians did do research, and that had to be very tough. When we engineers do research, we do experiments that we ourselves set up, control, and observe at leisure. What happens in history research? I guess you dig into musty old records. It strikes me as immensely tough.

Since our engineering lectures were often new material (note from last evening) and full of errors, we often floundered. To some extent, this indicated our own flawed understanding and accordingly flawed presentations. This would not be good for Freshman and Sophomore courses. But for Juniors, Seniors, and grad courses, the students have either dropped engineering (officially – or in fact) or discovered that they have “caught up” to the instructors. They are invited to participate. The instructors will learn from the students; if not the actual material, what the material means, and better ways to present and understand it. What a fine result to have both the students and the instructor leave the classroom having figured something out together.

Perhaps in some cultures or situations, students are not really expected to do anything that questions the instructor, even in the slightest. In my experience, this was half the fun. I recall one student asking a lecturer a question of the sort “I don’t see how you got from there to there.” After 10 seconds, the lecturer said “Ahhhh... You are being far too polite. You should have just pointed out that I am full of shit!” Then he went back and fixed the board.

I also note that students sitting away from the board may not recognize that the poor instructor, already being hounded to write bigger, doesn’t see very much of the material (to close). I recall one lecturer getting notation hopelessly garbled while various students pointed here-and-there and voiced corrections. It was much easier to see further back. In short order, the lecturer held up chalk and asked for someone to fix the equations. I don’t remember the student’s name (he was an Icelander) but he came up and fixed about a dozen items, and was modest in receiving thanks.

This technique of getting the students involved in fixing notational mistakes and poor explanations is very effective. So I will relate one more story about student involvement. In the very last class session I did with Tom Parks before he retired, we were doing a first-year graduate level class in modeling. I forget the exact topic. Our classroom was just down the hall from my office, and Tom was in the habit of dropping by 15 minutes early to discuss what we were going to do. He suggested one example to work out. I said it was too bad we didn’t have more time (or another class that term) or we could have done what we both agreed was a much better example. “Let’s do it,” he said. I must have looked horrified, because we both likely knew the neither of us knew exactly how to guarantee success. “Don’t worry,” he said, “the students will help us.” We did need their help, and succeeded with probably 5 minutes to spare. They helped precisely because they were included and were needed.

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FOUND ON THE WEB !

No sooner than (within an hour!) finishing the last paragraph above, I ran across the following WUWT blog article by Tim Ball.

<http://wattsupwiththat.com/2014/12/12/gruber-thinking-in-climate-science-disconnect-between-academia-and-the-real-world/#comment-1813078>

This is well worth the read in its entirety. It is multifaceted, but one of these themes (the way universities work) seemed a direct extension of what I had been discussing. Thus, I am excerpting and discussing some of what Tim said (Tim in blue type without quotes).

MAKING ENOUGH IMPRESSION TO ESTABLISH CONTACT

Naturally enough, I begin with the theme of obtaining and maintaining the student's attention. Tim wrote:

The Department chair told me I was an entertainer, to which I replied, if the students don't attend or fall asleep, the lecture is a waste of time.

(Apparently the chair thought of an entertaining lecture as prima facie condemnable.*)

I knew my colleagues saw my teaching ability as a handicap. They assume teaching and research are mutually exclusive.

THE "IVORY TOWER" VS THE REAL WORLD

Besides, they appreciated the real world examples I brought into the classroom.

(That is, Tim's students were glad to hear that there was an identifiable purpose to the information.)

.....the distance between academia and the real world. It is a gap academia wants to exist, because if people knew how little they do and what is actually going on, funding would be mostly withdrawn.

It appears politicians are the only group in society less qualified for a major part of their job, than university professors.

That is – professors are not required to know how to, or put effort into, teaching.

Most societies, that the academics would call "primitive", prepare their children for the real world. For the most part, we don't.

IS THERE A PURPOSE TO COLLEGE

Even for those who get in, most students just passing with a C average, are simply getting grades 13, 14, and 15, in what is really only a socially acceptable form of unemployment.

Suggesting that a college education “for nearly everyone” too often becomes a (pricey) placeholder.

.....Overall universities are a fraud. I am no fan of Prince Philip, but maybe as a vestige of medievalism himself, he recognizes what is going on when he said universities are the only true incestuous system in our society.

The faculty being a private “club” setting admission and performance criteria and expecting only approbation.

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NOTE:

* (from middle of page 5)

Here I have in mind a professor/instructor who, by nature or by design, manage to make the student more or less glad he/she bothered to come in. Perhaps it is largely a matter of talking to and with the students during lecture, not just talking. Perhaps it is unexpected stunts with a found 2 x 4. Sometimes it is “war stories” – I have always gotten complete attention by relating something that happened to working engineers. (Like the theory guys sending a messenger to call off a bread-boarding effort because what the engineers were trying could never work. Of course when the messenger got there, it was already running.) Likely having students scanning for errors and reacting to them with delight (on the part of both students and lecturer) is entertaining.

But, while a lecture needs to be more than just entertaining, why in the world would it be judged suspect if it is not blisteringly dry.

And – probably you have all seen these hilarious U. Toronto engineering videos!

<https://www.youtube.com/watch?v=FvVlsguq2yg>

<https://www.youtube.com/watch?v=8majjGwwDZY>