Teaching

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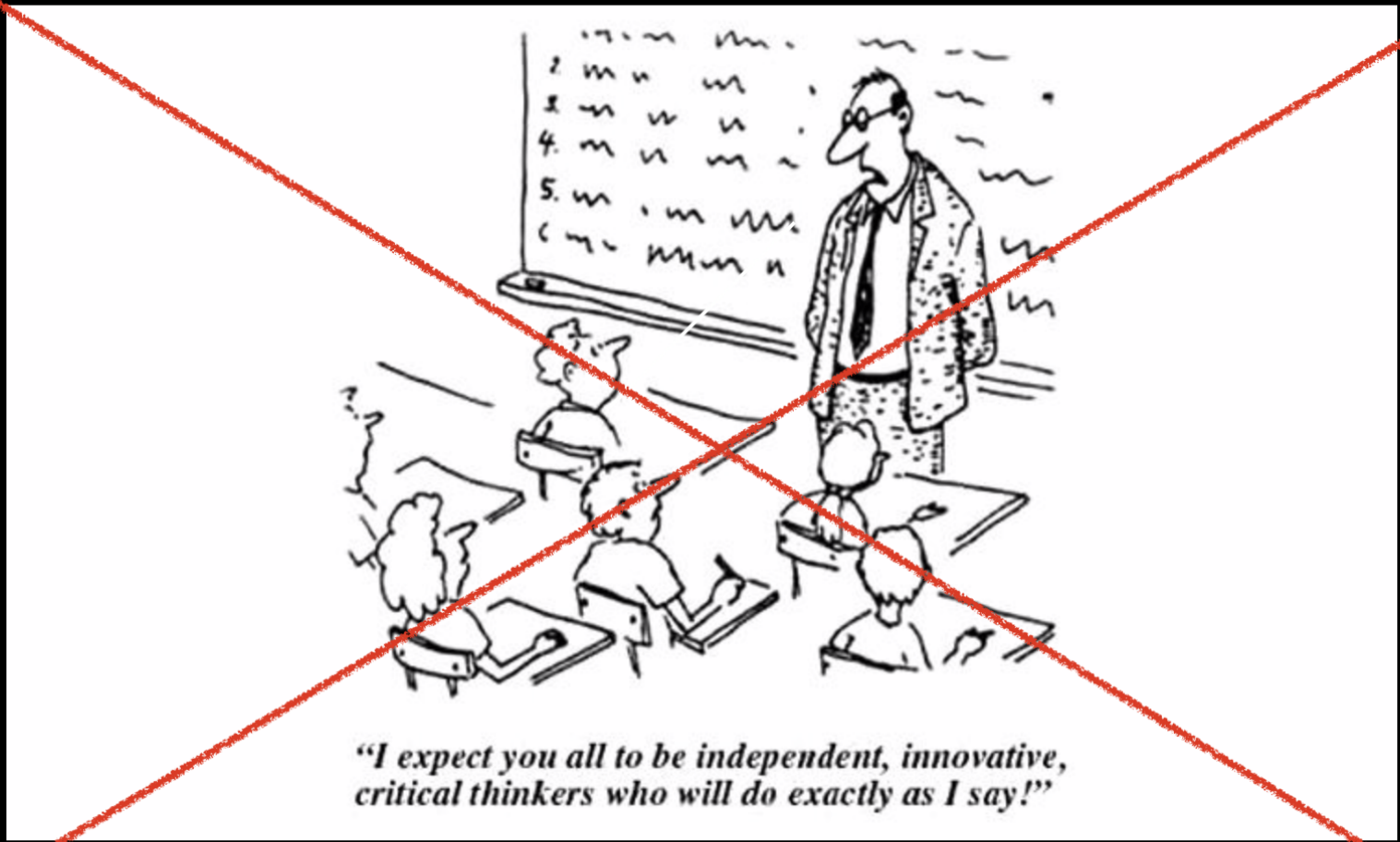
Teaching Philosophy



"I expect you all to be independent, innovative, critical thinkers who will do exactly as I say!"

Teacher, Professor?

Teaching Philosophy

Teacher, Professor?

I am an educational rockstar

Teaching Philosophy

"Intellectually entertain students and make them learn"

"Don't try to teach, try to make the students learn"

"Try to figure things out along with the students"

Teaching Philosophy

- Spend the first lecture on motivation
- Why, What and How?
- Numerical Linear Algebra
  - The $25,000,000,000 Eigenvector: Linear algebra behind google
  - The Smart Money's on Numerical Analysts

Adopt latest technologies in teaching

Example: Finite Precision Computation

Solving recurrence

$$a_{n+1} = 10a_n - 9a_{n-1}$$

with $a_0 = a_1 = 2.95$

Polynomial Interpolation & Approximation

Interpolate/Approximate

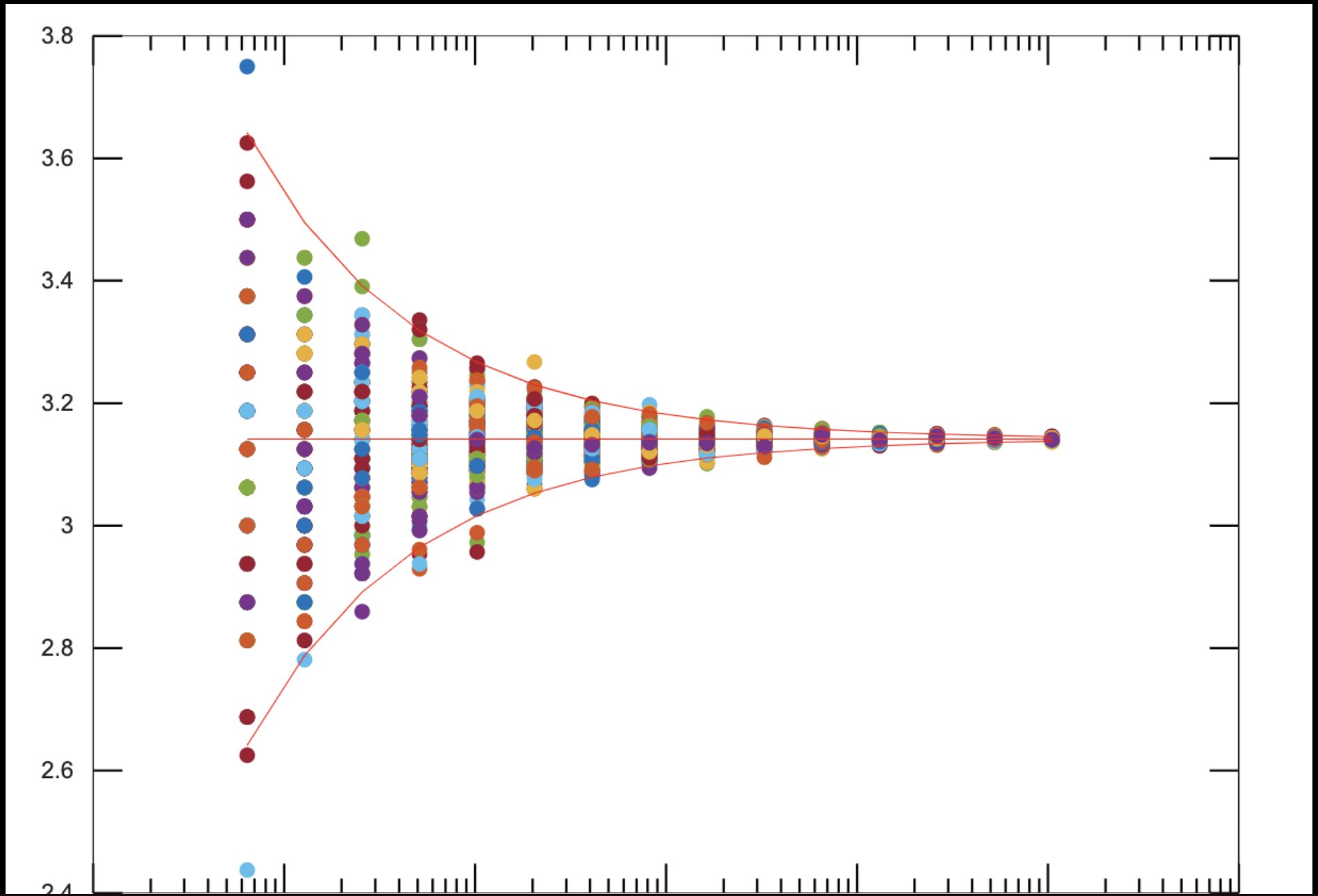
$$f(x) = \frac{1}{1 + 25x^2}$$

Weierstrass approximation theorem

MonteCarlo to compute π

```
% Computing pi by counting the number of points inside a [-1,1]^2 square that lie inside the unit
circle
N_sim = 200;
min_index = 6;
max_index = 20;
n_index = max_index-min_index+1;
p =zeros(n_index,N_sim);
K_index = min_index:max_index;
N = 2.**K_index;
N_matrix = zeros(n_index,N_sim);
for k =min_index:max_index
    N_matrix(k-min_index+1,:) = N(k-min_index+1);
    for j=1:N_sim
        x = 2*rand(N(k-min_index+1),2)-1;
        m = length(find(x(:,1).^2+x(:,2).^2 <1));
        p(k-min_index+1,j) = 4*m/N(k-min_index+1);
    end
end
semilogx(N_matrix,p,'.')
hold on
c = 4;
semilogx(N,pi+c./sqrt(N),'r-')
semilogx(N,pi*ones(n_index,1),'r-')
semilogx(N,pi-c./sqrt(N),'r-')
```

MonteCarlo to compute π



Summary of teaching philosophy

To heighten the understanding of concepts

- Proofs and more importantly examples/counterexamples
- Application of the theorems/results
- Live computational and mathematical demonstrations
  - Students appreciate that math and programming can go hand in hand
  - Both are simple and fun to play around

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- Live computational and mathematical demonstrations
  - Students appreciate that math and programming can go hand in hand
  - Both are simple and fun to play around
- Will think along with students for the logic to be followed
- Enable them to think on the fly and adapt; contributes to their understanding

These enable students to understand the details as well as to obtain a bird's eye view of the entire landscape.