# Teaching

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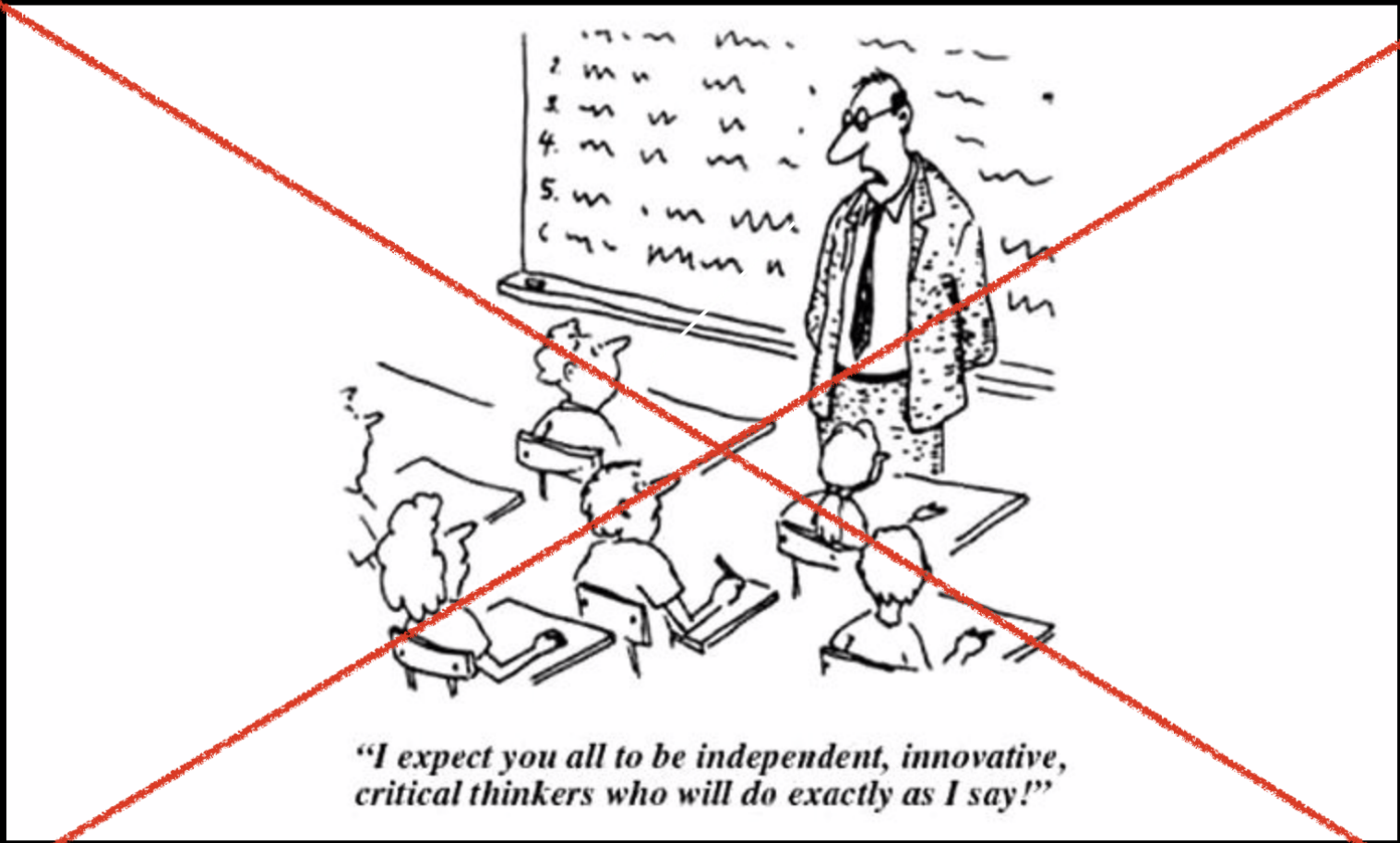
# Teaching Philosophy



# Teaching Philosophy

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

# Teaching Philosophy

## Adopt latest technologies in teaching




# Finite Precision Computation

Solving recurrence

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

with $a_0 = a_1 = 2.95$

# Polynomial Approximation

Interpolate/Approximate

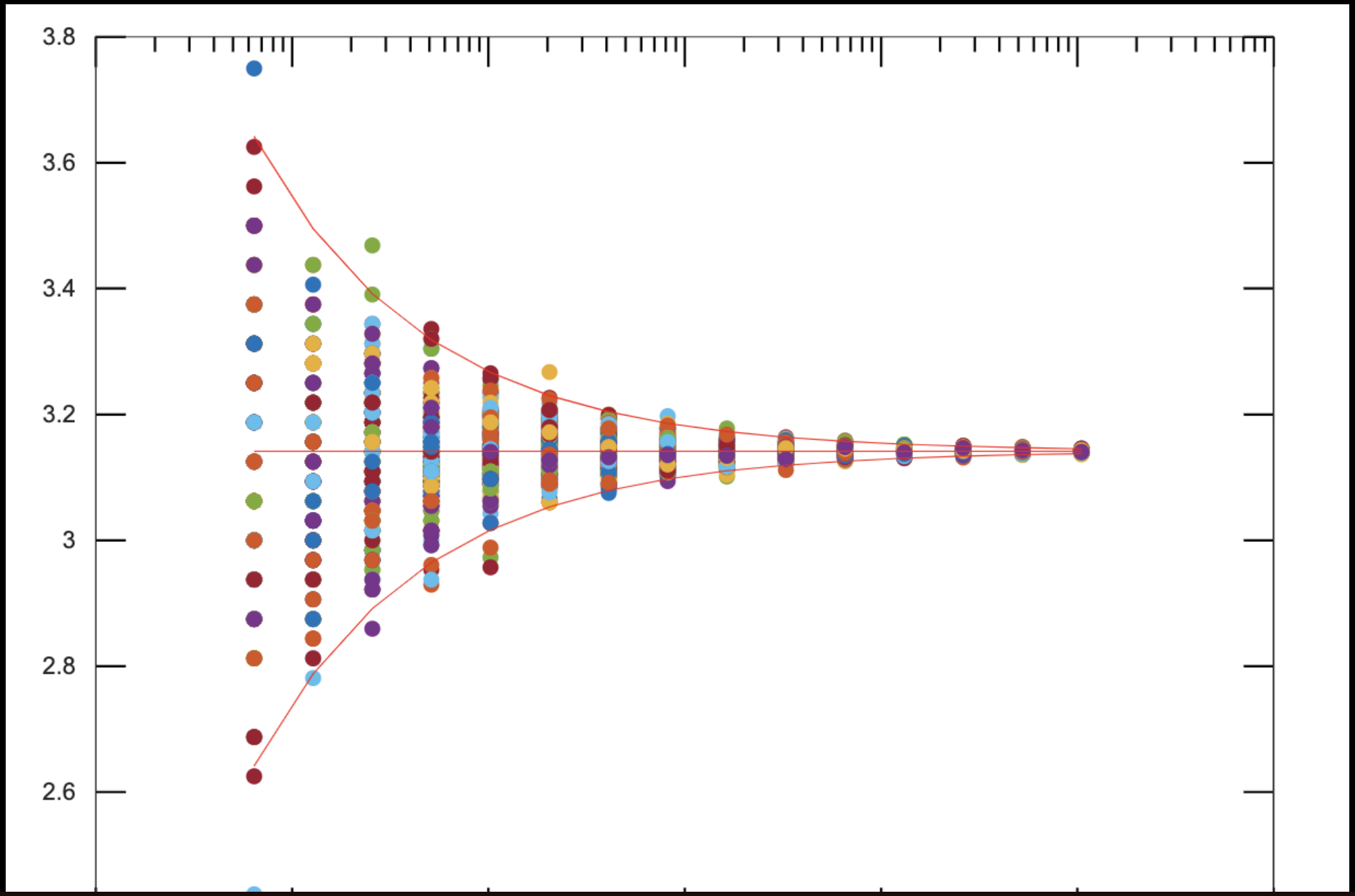
$$f(x) = \frac{1}{1 + 25x^2}$$

Weierstrass approximation theorem

# MonteCarlo to compute $\pi$

```
% 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 $\pi$



# 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.