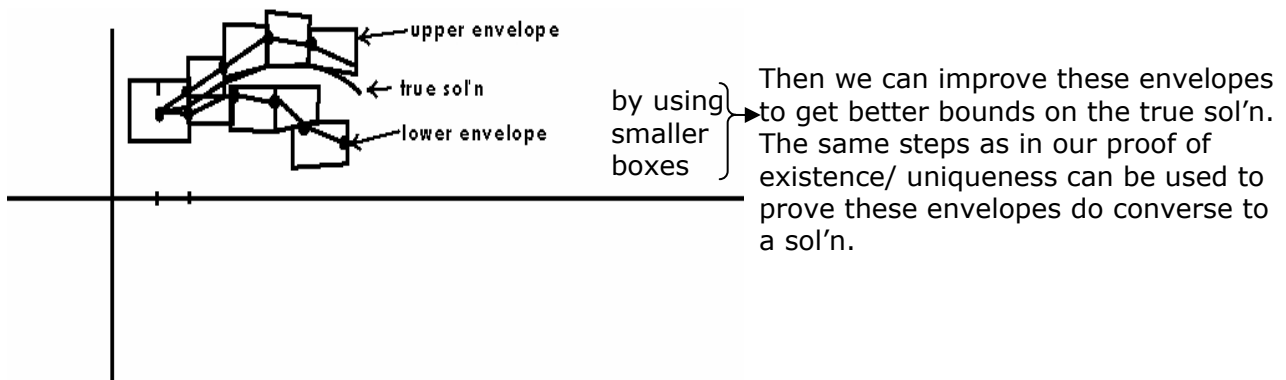


18.034, Honors Differential Equations
 Prof. Jason Starr
Recitation Suggestion
 2/17/04

1. There are several topics about the general existence/ uniqueness thm that I would have liked to discuss if there were time. If you would like to discuss them, that would be great.
- A. Bounds on the growth of $y(t)$ and $y'(t)$. If $f(t,y)$ is bounded by M , then $y(t)$ satisfies a Lipschitz constant M . In particular, "pathological" behaviors like vertical asymptotes or wild oscillation always occur because $f(t,y)$ becomes unbounded.
- B. Numerical approximation of a sol'n. We can find "piece-wise linear envelopes" for the graph of $y(t)$ as follows: On a small box $[t_0-a, t_0+a] \times [y_0-b, y_0+b]$ suppose $|f(y, t) - m_0| < \varepsilon_0$. Then the part of the graph in the box is trapped b/w $y_+(t) = y_0 + (m_0 + \varepsilon_0)(t - t_0)$ & $y_-(t) = y_0 + (m_0 - \varepsilon_0)(t - t_0)$. We can find the intersection pts of y_+ & y_- w/ the box and repeat with those as our initial values to get larger large piece-wise linear envelopes.



- C. (Non)- existence/ uniqueness if some hypothesis fail:
 They have a homework exercise about this.