Project 1

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Q(1) What do the Variable $V_{t,}$ $X_{t,}$ R_t in equations (16), (17), and (18) correspond to?

X_t denotes the observed frequency of litigation and should exhibit the growth-decay pattern which we hope to explain.
R_t denotes the reduction of uncertainty which has occrued at time t as a consequence of doctrinal development.
V_t denotes the level of uncertainty associated with the doctrinal shift, given the specific assumption, that no further litigation takes place.

Q(2) Why might we expect a bump in the amount of litigation after a policy change?

Because most people are demanding access to the court, and because the court itself is attempting to clarify and codify its position, the frequency of litigation temporarily increases. The temporary increase in agitation thus subsides as the law once again becomes more certain.

1. (16) $\Delta V_t = g(L - V_t)$
   (17) $\Delta R_t = f(B - R_t)$
   (18) $X_t = p(V_t - R_t)$
   By given g=0.4, f=0.2, L=1, B=0.75, and p=10.

Now (16) $\Delta V_t = g(L - V_t) \Rightarrow V_{t+1} - V_t = 0.4 - 0.4V_t \Rightarrow V_{t+1} = 0.6V_t + 0.4$ (Differential Equation)

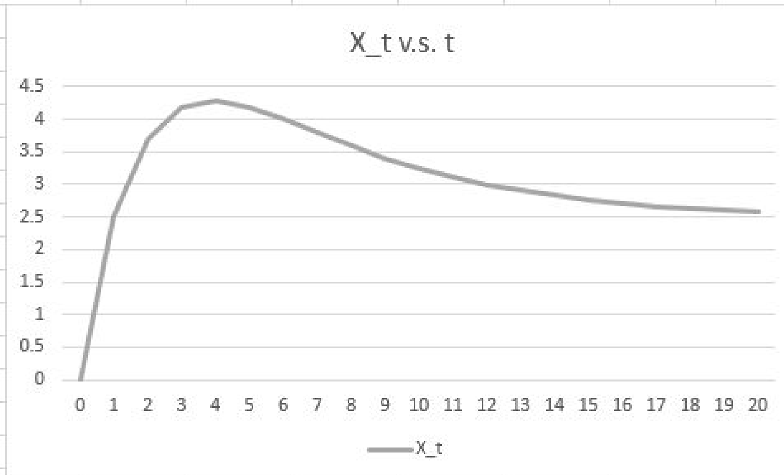
The closed form is $V_t = (0.6)^t V_0 + 0.4\frac{0.6^t - 1}{0.6 - 1} \Rightarrow V_t = (0.6)^t V_0 + 1 - 0.6^t$

(17) $\Delta R_t = f(B - R_t) \Rightarrow R_{t+1} - R_t = 0.2(0.75 - R_t) \Rightarrow R_{t+1} = 0.8R_t + 0.15$ (Differential Equation)

The closed form is $R_t = (0.8)^t R_0 + 0.15\frac{0.8^t - 1}{0.8 - 1} \Rightarrow R_t = (0.8)^t R_0 + 0.75 - 0.75(0.8)^t$

2. Initial condition $V_0 = 0$ and $R_0 = 0$ up to t=20. Plot X_t.

t	V_t	R_t	X_t
0	0	0	0
1	0.4	0.15	2.5
2	0.64	0.27	3.7
3	0.784	0.366	4.18
4	0.8704	0.4428	4.276
5	0.92224	0.50424	4.18
6	0.953344	0.553392	3.99952
7	0.972006	0.592714	3.792928
8	0.983204	0.624171	3.59033
9	0.989922	0.649337	3.405856
10	0.993953	0.669469	3.24484
11	0.996372	0.685575	3.107965
12	0.997823	0.69846	2.993628
13	0.998694	0.708768	2.899256
14	0.999216	0.717015	2.822017
15	0.99953	0.723612	2.759181
16	0.999718	0.728889	2.708285
17	0.999831	0.733112	2.667192
18	0.999898	0.736489	2.634092
19	0.999939	0.739191	2.607477
20	0.999963	0.741353	2.586103



According to graph, X_t is increasing from t=0 to t=5 then decreasing. By two standard forms, $\lim_{t\to\infty} X_t = 2.5$ so if t keeps increasing, X_t will be close to 2.5.