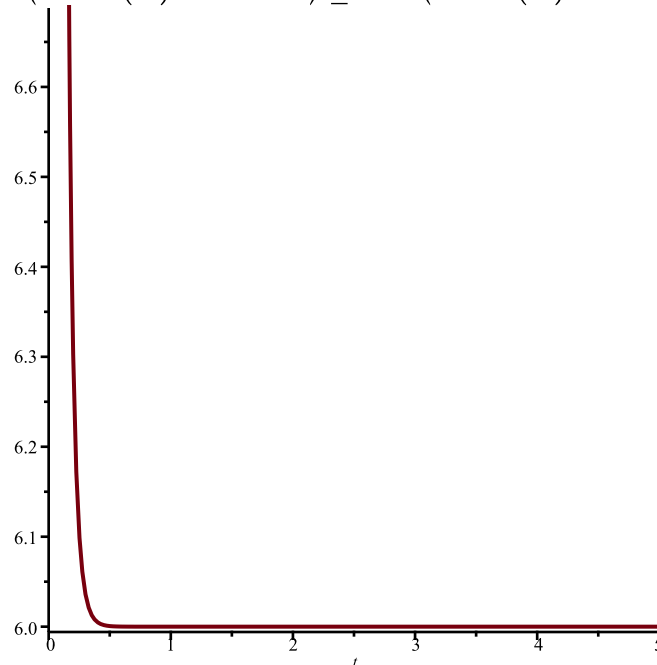


```
[> #HW 15 - Alan Ho
[> # OK to post
```

```
[> read("M15.txt")
[> #2)
[> # x'(t) = (1 - x(t)) · (2 - x(t)) · (6 - x(t)), x(0) = 3/2
> evalf( dsolve( { diff(f(t), t) = (1 - f(t)) · (2 - f(t)) · (6 - f(t)), f(0) = 3/2 }, f(t) ) )
f(t) = RootOf( -9216 - (-(e^t)^20 + 9) _Z^5 - (-20 (e^t)^20 + 180) _Z^4 - (-150 (e^t)^20
+ 1440) _Z^3 - (-500 (e^t)^20 + 5760) _Z^2 - (-625 (e^t)^20 + 11520) _Z) + 6. (1)
```

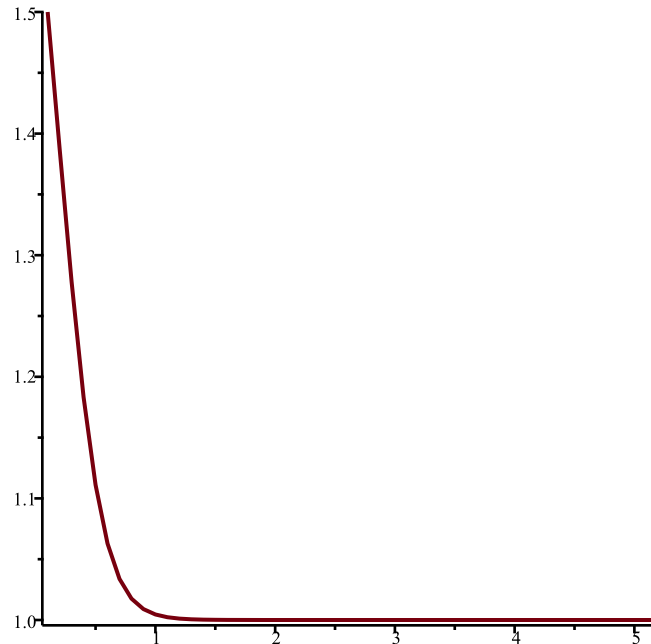
```
> f := plot( RootOf( -9216 - (-(e^t)^20 + 9) _Z^5 - (-20 (e^t)^20 + 180) _Z^4 - (-150 (e^t)^20
+ 1440) _Z^3 - (-500 (e^t)^20 + 5760) _Z^2 - (-625 (e^t)^20 + 11520) _Z) + 6, t=0..5)
```



```
> L := DisI( ((1 - f(t)) · (2 - f(t)) · (6 - f(t))), f(t), 3/2, 0.1, 5 )
L := [ [0.1, 3/2], [0.2, 1.387500000], [0.3, 1.278025195], [0.4, 1.183242324], [0.5,
1.111152525], [0.6, 1.062851865], [0.7, 1.033771318], [0.8, 1.017566109], [0.9,
1.008967653], [1.0, 1.004532006], [1.1, 1.002278317], [1.2, 1.001142272], [1.3,
1.000571919], [1.4, 1.000286156], [1.5, 1.000143127], [1.6, 1.000071576], [1.7,
1.000035791], [1.8, 1.000017896], [1.9, 1.000008948], [2.0, 1.000004474], [2.1,
1.000002237], [2.2, 1.000001119], [2.3, 1.000000560], [2.4, 1.000000280], [2.5,
1.000000140], [2.6, 1.000000070], [2.7, 1.000000035], [2.8, 1.000000018], [2.9,
1.000000009], [3.0, 1.000000005], [3.1, 1.000000003], [3.2, 1.000000002], [3.3,
1.000000001], [3.4, 1.000000001], [3.5, 1.000000001], [3.6, 1.000000001], [3.7,
```

1.000000001], [3.8, 1.000000001], [3.9, 1.000000001], [4.0, 1.000000001], [4.1, 1.000000001], [4.2, 1.000000001], [4.3, 1.000000001], [4.4, 1.000000001], [4.5, 1.000000001], [4.6, 1.000000001], [4.7, 1.000000001], [4.8, 1.000000001], [4.9, 1.000000001], [5.0, 1.000000001], [5.1, 1.000000001], [5.2, 1.000000001]]

> plot(L);



> L2 := DisI(((1 - f(t)) · (2 - f(t)) · (6 - f(t))), f(t), $\frac{3}{2}$, 0.01, 5)

L2 := [[[0.01, $\frac{3}{2}$], [0.02, 1.488750000], [0.03, 1.477477585], [0.04, 1.466194220], [0.05, 1.454911519], [0.06, 1.443641198], [0.07, 1.432395025], [0.08, 1.421184772], [0.09, 1.410022163], [0.10, 1.398918824], [0.11, 1.387886232], [0.12, 1.376935667], [0.13, 1.366078161], [0.14, 1.355324453], [0.15, 1.344684942], [0.16, 1.334169645], [0.17, 1.323788159], [0.18, 1.313549622], [0.19, 1.303462682], [0.20, 1.293535466], [0.21, 1.283775558], [0.22, 1.274189974], [0.23, 1.264785147], [0.24, 1.255566916], [0.25, 1.246540515], [0.26, 1.237710570], [0.27, 1.229081099], [0.28, 1.220655516], [0.29, 1.212436637], [0.30, 1.204426693], [0.31, 1.196627344], [0.32, 1.189039695], [0.33, 1.181664315], [0.34, 1.174501262], [0.35, 1.167550103], [0.36, 1.160809944], [0.37, 1.154279452], [0.38, 1.147956887], [0.39, 1.141840127], [0.40, 1.135926702], [0.41, 1.130213817], [0.42, 1.124698386], [0.43, 1.119377058], [0.44, 1.114246246], [0.45, 1.109302154], [0.46, 1.104540806], [0.47, 1.099958067], [0.48, 1.095549673], [0.49, 1.091311250], [0.50, 1.087238339], [0.51, 1.083326414], [0.52, 1.079570905], [0.53, 1.075967213], [0.54, 1.072510729], [0.55, 1.069196848], [0.56, 1.066020985], [0.57, 1.062978584], [0.58, 1.060065135], [0.59, 1.057276180], [0.60, 1.054607326], [0.61, 1.052054249], [0.62, 1.049612705], [0.63, 1.047278534], [0.64, 1.045047666], [0.65,

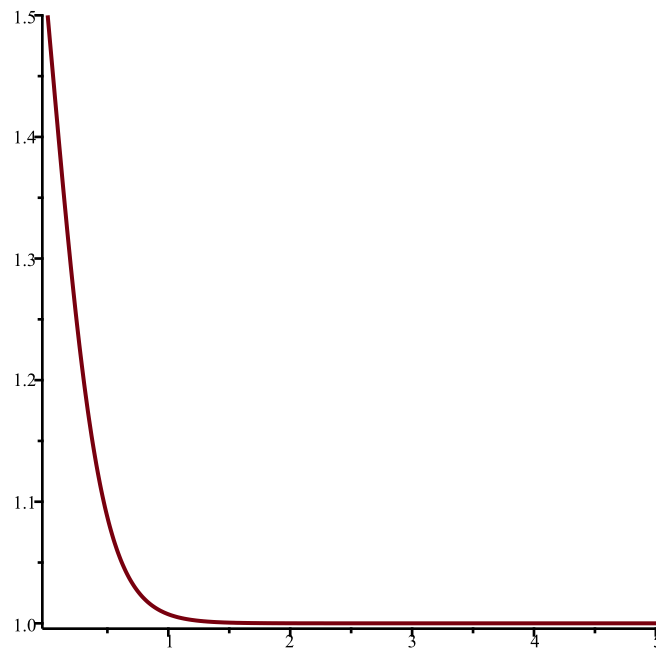
(3)

1.042916126], [0.66, 1.040880037], [0.67, 1.038935623], [0.68, 1.037079211], [0.69, 1.035307233], [0.70, 1.033616227], [0.71, 1.032002839], [0.72, 1.030463820], [0.73, 1.028996029], [0.74, 1.027596430], [0.75, 1.026262092], [0.76, 1.024990188], [0.77, 1.023777993], [0.78, 1.022622882], [0.79, 1.021522330], [0.80, 1.020473906], [0.81, 1.019475276], [0.82, 1.018524196], [0.83, 1.017618511], [0.84, 1.016756155], [0.85, 1.015935146], [0.86, 1.015153584], [0.87, 1.014409648], [0.88, 1.013701594], [0.89, 1.013027753], [0.90, 1.012386527], [0.91, 1.011776387], [0.92, 1.011195872], [0.93, 1.010643585], [0.94, 1.010118191], [0.95, 1.009618414], [0.96, 1.009143035], [0.97, 1.008690891], [0.98, 1.008260872], [0.99, 1.007851917], [1.00, 1.007463015], [1.01, 1.007093202], [1.02, 1.006741557], [1.03, 1.006407203], [1.04, 1.006089303], [1.05, 1.005787060], [1.06, 1.005499714], [1.07, 1.005226541], [1.08, 1.004966852], [1.09, 1.004719988], [1.10, 1.004485324], [1.11, 1.004262264], [1.12, 1.004050240], [1.13, 1.003848712], [1.14, 1.003657165], [1.15, 1.003475109], [1.16, 1.003302078], [1.17, 1.003137628], [1.18, 1.002981337], [1.19, 1.002832803], [1.20, 1.002691644], [1.21, 1.002557496], [1.22, 1.002430013], [1.23, 1.002308867], [1.24, 1.002193743], [1.25, 1.002084344], [1.26, 1.001980387], [1.27, 1.001881603], [1.28, 1.001787735], [1.29, 1.001698540], [1.30, 1.001613786], [1.31, 1.001533253], [1.32, 1.001456731], [1.33, 1.001384022], [1.34, 1.001314936], [1.35, 1.001249293], [1.36, 1.001186922], [1.37, 1.001127660], [1.38, 1.001071353], [1.39, 1.001017854], [1.40, 1.000967023], [1.41, 1.000918728], [1.42, 1.000872842], [1.43, 1.000829246], [1.44, 1.000787825], [1.45, 1.000748471], [1.46, 1.000711081], [1.47, 1.000675557], [1.48, 1.000641807], [1.49, 1.000609741], [1.50, 1.000579276], [1.51, 1.000550332], [1.52, 1.000522834], [1.53, 1.000496709], [1.54, 1.000471888], [1.55, 1.000448307], [1.56, 1.000425904], [1.57, 1.000404620], [1.58, 1.000384399], [1.59, 1.000365188], [1.60, 1.000346937], [1.61, 1.000329597], [1.62, 1.000313124], [1.63, 1.000297474], [1.64, 1.000282606], [1.65, 1.000268480], [1.66, 1.000255060], [1.67, 1.000242311], [1.68, 1.000230199], [1.69, 1.000218692], [1.70, 1.000207760], [1.71, 1.000197375], [1.72, 1.000187509], [1.73, 1.000178136], [1.74, 1.000169231], [1.75, 1.000160771], [1.76, 1.000152734], [1.77, 1.000145099], [1.78, 1.000137845], [1.79, 1.000130954], [1.80, 1.000124407], [1.81, 1.000118188], [1.82, 1.000112279], [1.83, 1.000106666], [1.84, 1.000101333], [1.85, 1.000096267], [1.86, 1.000091454], [1.87, 1.000086882], [1.88, 1.000082538], [1.89, 1.000078412], [1.90, 1.000074492], [1.91, 1.000070768], [1.92, 1.000067230], [1.93, 1.000063869], [1.94, 1.000060676], [1.95, 1.000057642], [1.96, 1.000054760], [1.97, 1.000052022], [1.98, 1.000049421], [1.99, 1.000046950], [2.00, 1.000044603], [2.01, 1.000042373], [2.02, 1.000040254], [2.03, 1.000038241], [2.04, 1.000036329], [2.05, 1.000034513], [2.06, 1.000032787], [2.07, 1.000031148], [2.08, 1.000029591], [2.09, 1.000028112], [2.10, 1.000026706], [2.11, 1.000025371], [2.12, 1.000024102], [2.13, 1.000022897], [2.14, 1.000021752], [2.15, 1.000020664], [2.16, 1.000019631], [2.17,

1.000018649], [2.18, 1.000017717], [2.19, 1.000016831], [2.20, 1.000015989], [2.21, 1.000015190], [2.22, 1.000014431], [2.23, 1.000013709], [2.24, 1.000013024], [2.25, 1.000012373], [2.26, 1.000011754], [2.27, 1.000011166], [2.28, 1.000010608], [2.29, 1.000010078], [2.30, 1.000009574], [2.31, 1.000009095], [2.32, 1.000008640], [2.33, 1.000008208], [2.34, 1.000007798], [2.35, 1.000007408], [2.36, 1.000007038], [2.37, 1.000006686], [2.38, 1.000006352], [2.39, 1.000006034], [2.40, 1.000005732], [2.41, 1.000005445], [2.42, 1.000005173], [2.43, 1.000004914], [2.44, 1.000004668], [2.45, 1.000004435], [2.46, 1.000004213], [2.47, 1.000004002], [2.48, 1.000003802], [2.49, 1.000003612], [2.50, 1.000003431], [2.51, 1.000003259], [2.52, 1.000003096], [2.53, 1.000002941], [2.54, 1.000002794], [2.55, 1.000002654], [2.56, 1.000002521], [2.57, 1.000002395], [2.58, 1.000002275], [2.59, 1.000002161], [2.60, 1.000002053], [2.61, 1.000001950], [2.62, 1.000001853], [2.63, 1.000001760], [2.64, 1.000001672], [2.65, 1.000001588], [2.66, 1.000001509], [2.67, 1.000001434], [2.68, 1.000001362], [2.69, 1.000001294], [2.70, 1.000001229], [2.71, 1.000001168], [2.72, 1.000001110], [2.73, 1.000001055], [2.74, 1.000001002], [2.75, 1.000000952], [2.76, 1.000000904], [2.77, 1.000000859], [2.78, 1.000000816], [2.79, 1.000000775], [2.80, 1.000000736], [2.81, 1.000000699], [2.82, 1.000000664], [2.83, 1.000000631], [2.84, 1.000000599], [2.85, 1.000000569], [2.86, 1.000000541], [2.87, 1.000000514], [2.88, 1.000000488], [2.89, 1.000000464], [2.90, 1.000000441], [2.91, 1.000000419], [2.92, 1.000000398], [2.93, 1.000000378], [2.94, 1.000000359], [2.95, 1.000000341], [2.96, 1.000000324], [2.97, 1.000000308], [2.98, 1.000000293], [2.99, 1.000000278], [3.00, 1.000000264], [3.01, 1.000000251], [3.02, 1.000000238], [3.03, 1.000000226], [3.04, 1.000000215], [3.05, 1.000000204], [3.06, 1.000000194], [3.07, 1.000000184], [3.08, 1.000000175], [3.09, 1.000000166], [3.10, 1.000000158], [3.11, 1.000000150], [3.12, 1.000000143], [3.13, 1.000000136], [3.14, 1.000000129], [3.15, 1.000000123], [3.16, 1.000000117], [3.17, 1.000000111], [3.18, 1.000000105], [3.19, 1.000000100], [3.20, 1.000000095], [3.21, 1.000000090], [3.22, 1.000000086], [3.23, 1.000000082], [3.24, 1.000000078], [3.25, 1.000000074], [3.26, 1.000000070], [3.27, 1.000000067], [3.28, 1.000000064], [3.29, 1.000000061], [3.30, 1.000000058], [3.31, 1.000000055], [3.32, 1.000000052], [3.33, 1.000000049], [3.34, 1.000000047], [3.35, 1.000000045], [3.36, 1.000000043], [3.37, 1.000000041], [3.38, 1.000000039], [3.39, 1.000000037], [3.40, 1.000000035], [3.41, 1.000000033], [3.42, 1.000000031], [3.43, 1.000000029], [3.44, 1.000000028], [3.45, 1.000000027], [3.46, 1.000000026], [3.47, 1.000000025], [3.48, 1.000000024], [3.49, 1.000000023], [3.50, 1.000000022], [3.51, 1.000000021], [3.52, 1.000000020], [3.53, 1.000000019], [3.54, 1.000000018], [3.55, 1.000000017], [3.56, 1.000000016], [3.57, 1.000000015], [3.58, 1.000000014], [3.59, 1.000000013], [3.60, 1.000000012], [3.61, 1.000000011], [3.62, 1.000000010], [3.63, 1.000000010], [3.64, 1.000000010], [3.65, 1.000000010], [3.66, 1.000000010], [3.67, 1.000000010], [3.68, 1.000000010], [3.69,

1.000000010], [3.70, 1.000000010], [3.71, 1.000000010], [3.72, 1.000000010], [3.73, 1.000000010], [3.74, 1.000000010], [3.75, 1.000000010], [3.76, 1.000000010], [3.77, 1.000000010], [3.78, 1.000000010], [3.79, 1.000000010], [3.80, 1.000000010], [3.81, 1.000000010], [3.82, 1.000000010], [3.83, 1.000000010], [3.84, 1.000000010], [3.85, 1.000000010], [3.86, 1.000000010], [3.87, 1.000000010], [3.88, 1.000000010], [3.89, 1.000000010], [3.90, 1.000000010], [3.91, 1.000000010], [3.92, 1.000000010], [3.93, 1.000000010], [3.94, 1.000000010], [3.95, 1.000000010], [3.96, 1.000000010], [3.97, 1.000000010], [3.98, 1.000000010], [3.99, 1.000000010], [4.00, 1.000000010], [4.01, 1.000000010], [4.02, 1.000000010], [4.03, 1.000000010], [4.04, 1.000000010], [4.05, 1.000000010], [4.06, 1.000000010], [4.07, 1.000000010], [4.08, 1.000000010], [4.09, 1.000000010], [4.10, 1.000000010], [4.11, 1.000000010], [4.12, 1.000000010], [4.13, 1.000000010], [4.14, 1.000000010], [4.15, 1.000000010], [4.16, 1.000000010], [4.17, 1.000000010], [4.18, 1.000000010], [4.19, 1.000000010], [4.20, 1.000000010], [4.21, 1.000000010], [4.22, 1.000000010], [4.23, 1.000000010], [4.24, 1.000000010], [4.25, 1.000000010], [4.26, 1.000000010], [4.27, 1.000000010], [4.28, 1.000000010], [4.29, 1.000000010], [4.30, 1.000000010], [4.31, 1.000000010], [4.32, 1.000000010], [4.33, 1.000000010], [4.34, 1.000000010], [4.35, 1.000000010], [4.36, 1.000000010], [4.37, 1.000000010], [4.38, 1.000000010], [4.39, 1.000000010], [4.40, 1.000000010], [4.41, 1.000000010], [4.42, 1.000000010], [4.43, 1.000000010], [4.44, 1.000000010], [4.45, 1.000000010], [4.46, 1.000000010], [4.47, 1.000000010], [4.48, 1.000000010], [4.49, 1.000000010], [4.50, 1.000000010], [4.51, 1.000000010], [4.52, 1.000000010], [4.53, 1.000000010], [4.54, 1.000000010], [4.55, 1.000000010], [4.56, 1.000000010], [4.57, 1.000000010], [4.58, 1.000000010], [4.59, 1.000000010], [4.60, 1.000000010], [4.61, 1.000000010], [4.62, 1.000000010], [4.63, 1.000000010], [4.64, 1.000000010], [4.65, 1.000000010], [4.66, 1.000000010], [4.67, 1.000000010], [4.68, 1.000000010], [4.69, 1.000000010], [4.70, 1.000000010], [4.71, 1.000000010], [4.72, 1.000000010], [4.73, 1.000000010], [4.74, 1.000000010], [4.75, 1.000000010], [4.76, 1.000000010], [4.77, 1.000000010], [4.78, 1.000000010], [4.79, 1.000000010], [4.80, 1.000000010], [4.81, 1.000000010], [4.82, 1.000000010], [4.83, 1.000000010], [4.84, 1.000000010], [4.85, 1.000000010], [4.86, 1.000000010], [4.87, 1.000000010], [4.88, 1.000000010], [4.89, 1.000000010], [4.90, 1.000000010], [4.91, 1.000000010], [4.92, 1.000000010], [4.93, 1.000000010], [4.94, 1.000000010], [4.95, 1.000000010], [4.96, 1.000000010], [4.97, 1.000000010], [4.98, 1.000000010], [4.99, 1.000000010], [5.00, 1.000000010], [5.01, 1.000000010], [5.02, 1.000000010]]

> *plot(L2)*



```
> # x'(t) = (1 - x(t)) · (2 - x(t)) · (6 - x(t)), x(0) = 4
> evalf(dsolve({diff(f(x), x) = (1 - f(x)) · (2 - f(x)) · (6 - f(x)), f(0) = 4}, f(x)))
f(x) = RootOf(82944 - (-16 (e^x)^20 - 81) _Z^5 - (-320 (e^x)^20 - 1620) _Z^4 - (-2400 (e^x)^20 - 12960) _Z^3 - (-8000 (e^x)^20 - 51840) _Z^2 - (-10000 (e^x)^20 - 103680) _Z) + 6. (4)
```

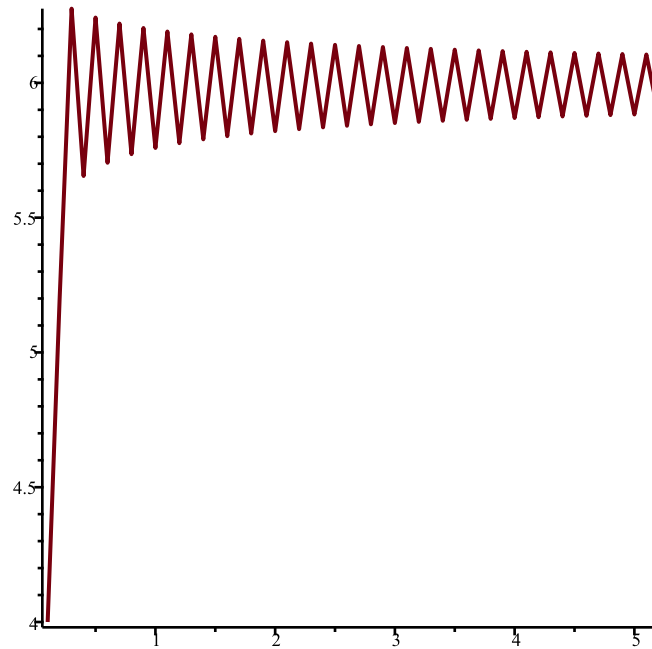
```
> f := plot(RootOf(82944 - (-16 (e^t)^20 - 81) _Z^5 - (-320 (e^t)^20 - 1620) _Z^4 - (-2400 (e^t)^20 - 12960) _Z^3 - (-8000 (e^t)^20 - 51840) _Z^2 - (-10000 (e^t)^20 - 103680) _Z) + 6, t = 0..5)
```

> #for some reason, Maple won't plot this expression? Just have to assume that this plot will match the discretization ones

```
> L := DisI(((1 - f(t)) · (2 - f(t)) · (6 - f(t))), f(t), 4, 0.1, 5)
L := [[0.1, 4], [0.2, 5.2], [0.3, 6.2752], [0.4, 5.654554236], [0.5, 6.242168566], [0.6, 5.703630169], [0.7, 6.219921429], [0.8, 5.735486020], [0.9, 6.203393841], [1.0, 5.758532589], [1.1, 6.190399464], [1.2, 5.776283540], [1.3, 6.179791991], [1.4, 5.790534184], [1.5, 6.170896531], [1.6, 5.802319293], [1.7, 6.163283301], [1.8, 5.812286069], [1.9, 6.156662502], [2.0, 5.820864173], [2.1, 6.150829987], [2.2, 5.828352163], [2.3, 6.145636881], [2.4, 5.834965131], [2.5, 6.140971509], [2.6, 5.840862669], [2.7, 6.136748120], [2.8, 5.846166117], [2.9, 6.132899552], [3.0, 5.850969655], [3.1, 6.129372303], [3.2, 5.855347691], [3.3, 6.126123122], [3.4, 5.859359916], [3.5, 6.123116595], [3.6, 5.863054862], [3.7, 6.120323391], [3.8, 5.866472462], [3.9, 6.117718969], [4.0, 5.869645919], [4.1, 6.115282613], [4.2, 5.872603103], [4.3, 6.112996689], [4.4, 5.875367608], [4.5, 6.110846077], [4.6, 5.877959560], [4.7, 6.108817723], [4.8, 5.880396256], [4.9, 6.106900288], [5.0,
```

5.882692646], [5.1, 6.105083867], [5.2, 5.884861736]]

> plot(L)



> L2 := DisI((1 - f(t)) · (2 - f(t)) · (6 - f(t))), f(t), 4, 0.01, 5)

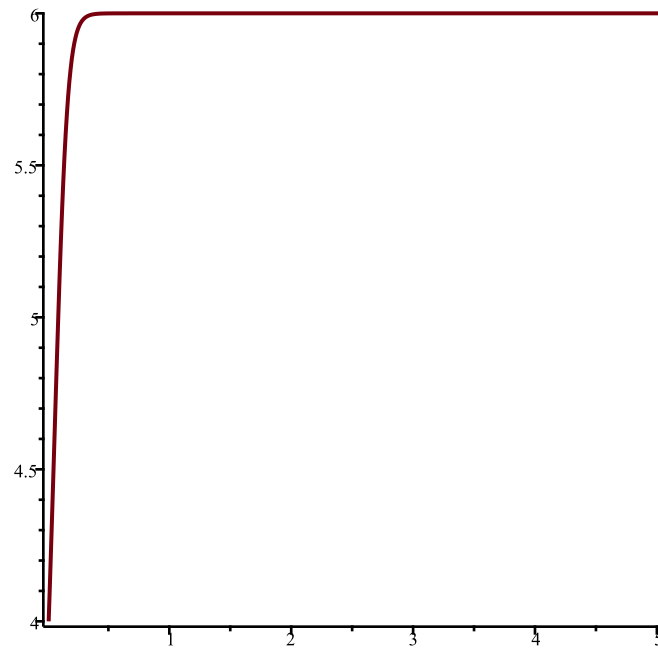
L2 := [[0.01, 4], [0.02, 4.12], [0.03, 4.24435072], [0.04, 4.372187635], [0.05,

4.502403864], [0.06, 4.633659614], [0.07, 4.764415965], [0.08, 4.892995925], [0.09, 5.017671388], [0.10, 5.136769027], [0.11, 5.248782646], [0.12, 5.352475967], [0.13, 5.446959897], [0.14, 5.531732607], [0.15, 5.606678184], [0.16, 5.672027840], [0.17, 5.728294141], [0.18, 5.776191730], [0.19, 5.816557377], [0.20, 5.850279025], [0.21, 5.878239309], [0.22, 5.901275189], [0.23, 5.920152581], [0.24, 5.935553351], [0.25, 5.948071554], [0.26, 5.958215953], [0.27, 5.966416360], [0.28, 5.973031959], [0.29, 5.978360309], [0.30, 5.982646204], [0.31, 5.986089912], [0.32, 5.988854542], [0.33, 5.991072468], [0.34, 5.992850808], [0.35, 5.994276050], [0.36, 5.995417893], [0.37, 5.996332426], [0.38, 5.997064731], [0.39, 5.997651010], [0.40, 5.998120312], [0.41, 5.998495932], [0.42, 5.998796542], [0.43, 5.999037103], [0.44, 5.999229599], [0.45, 5.999383626], [0.46, 5.999506867], [0.47, 5.999605472], [0.48, 5.999684364], [0.49, 5.999747482], [0.50, 5.999797980], [0.51, 5.999838380], [0.52, 5.999870702], [0.53, 5.999896560], [0.54, 5.999917247], [0.55, 5.999933797], [0.56, 5.999947037], [0.57, 5.999957629], [0.58, 5.999966103], [0.59, 5.999972882], [0.60, 5.999978306], [0.61, 5.999982645], [0.62, 5.999986116], [0.63, 5.999988893], [0.64, 5.999991114], [0.65, 5.999992891], [0.66, 5.999994313], [0.67, 5.999995450], [0.68, 5.999996360], [0.69, 5.999997088], [0.70, 5.999997670], [0.71, 5.999998136], [0.72, 5.999998509], [0.73, 5.999998807], [0.74, 5.999999046], [0.75, 5.999999237], [0.76, 5.999999390], [0.77, 5.999999512], [0.78, 5.999999610], [0.79, 5.999999688], [0.80, 5.999999750], [0.81, 5.999999800], [0.82, 5.999999840], [0.83, 5.999999872], [0.84, 5.999999898], [0.85,

(6)

5.999999998], [3.90, 5.999999998], [3.91, 5.999999998], [3.92, 5.999999998], [3.93, 5.999999998], [3.94, 5.999999998], [3.95, 5.999999998], [3.96, 5.999999998], [3.97, 5.999999998], [3.98, 5.999999998], [3.99, 5.999999998], [4.00, 5.999999998], [4.01, 5.999999998], [4.02, 5.999999998], [4.03, 5.999999998], [4.04, 5.999999998], [4.05, 5.999999998], [4.06, 5.999999998], [4.07, 5.999999998], [4.08, 5.999999998], [4.09, 5.999999998], [4.10, 5.999999998], [4.11, 5.999999998], [4.12, 5.999999998], [4.13, 5.999999998], [4.14, 5.999999998], [4.15, 5.999999998], [4.16, 5.999999998], [4.17, 5.999999998], [4.18, 5.999999998], [4.19, 5.999999998], [4.20, 5.999999998], [4.21, 5.999999998], [4.22, 5.999999998], [4.23, 5.999999998], [4.24, 5.999999998], [4.25, 5.999999998], [4.26, 5.999999998], [4.27, 5.999999998], [4.28, 5.999999998], [4.29, 5.999999998], [4.30, 5.999999998], [4.31, 5.999999998], [4.32, 5.999999998], [4.33, 5.999999998], [4.34, 5.999999998], [4.35, 5.999999998], [4.36, 5.999999998], [4.37, 5.999999998], [4.38, 5.999999998], [4.39, 5.999999998], [4.40, 5.999999998], [4.41, 5.999999998], [4.42, 5.999999998], [4.43, 5.999999998], [4.44, 5.999999998], [4.45, 5.999999998], [4.46, 5.999999998], [4.47, 5.999999998], [4.48, 5.999999998], [4.49, 5.999999998], [4.50, 5.999999998], [4.51, 5.999999998], [4.52, 5.999999998], [4.53, 5.999999998], [4.54, 5.999999998], [4.55, 5.999999998], [4.56, 5.999999998], [4.57, 5.999999998], [4.58, 5.999999998], [4.59, 5.999999998], [4.60, 5.999999998], [4.61, 5.999999998], [4.62, 5.999999998], [4.63, 5.999999998], [4.64, 5.999999998], [4.65, 5.999999998], [4.66, 5.999999998], [4.67, 5.999999998], [4.68, 5.999999998], [4.69, 5.999999998], [4.70, 5.999999998], [4.71, 5.999999998], [4.72, 5.999999998], [4.73, 5.999999998], [4.74, 5.999999998], [4.75, 5.999999998], [4.76, 5.999999998], [4.77, 5.999999998], [4.78, 5.999999998], [4.79, 5.999999998], [4.80, 5.999999998], [4.81, 5.999999998], [4.82, 5.999999998], [4.83, 5.999999998], [4.84, 5.999999998], [4.85, 5.999999998], [4.86, 5.999999998], [4.87, 5.999999998], [4.88, 5.999999998], [4.89, 5.999999998], [4.90, 5.999999998], [4.91, 5.999999998], [4.92, 5.999999998], [4.93, 5.999999998], [4.94, 5.999999998], [4.95, 5.999999998], [4.96, 5.999999998], [4.97, 5.999999998], [4.98, 5.999999998], [4.99, 5.999999998], [5.00, 5.999999998], [5.01, 5.999999998], [5.02, 5.999999998]]

> *plot(L2)*



> #2)

$$\text{ToSys}\left(4, z, \frac{z[1] + 2 \cdot z[2] + 3 \cdot z[3] + 11 \cdot z[4]}{z[1] + z[3]}, [1, 5, 5, 2]\right)$$

$$\left[\frac{z_1 + 2 z_2 + 3 z_3 + 11 z_4}{z_1 + z_3}, z_1, z_2, z_3 \right], [1, 5, 5, 2]$$

(7)

> #k=4 because there the recurrence is 4th order, f is the substitute form of the recurrence equation given, and INI is the set of basic conditions also given

> #3)

> with(LinearAlgebra)

[&x, Add, Adjoint, BackwardSubstitute, BandMatrix, Basis, BezoutMatrix, BidiagonalForm, BilinearForm, CARE, CharacteristicMatrix, CharacteristicPolynomial, Column, ColumnDimension, ColumnOperation, ColumnSpace, CompanionMatrix, CompressedSparseForm, ConditionNumber, ConstantMatrix, ConstantVector, Copy, CreatePermutation, CrossProduct, DARE, DeleteColumn, DeleteRow, Determinant, Diagonal, DiagonalMatrix, Dimension, Dimensions, DotProduct, EigenConditionNumbers, Eigenvalues, Eigenvectors, Equal, ForwardSubstitute, FrobeniusForm, FromCompressedSparseForm, FromSplitForm, GaussianElimination, GenerateEquations, GenerateMatrix, Generic, GetResultDataType, GetResultShape, GivensRotationMatrix, GramSchmidt, HankelMatrix, HermiteForm, HermitianTranspose, HessenbergForm, HilbertMatrix, HouseholderMatrix, IdentityMatrix, IntersectionBasis, IsDefinite, IsOrthogonal, IsSimilar, IsUnitary, JordanBlockMatrix, JordanForm, KroneckerProduct, LA_Main, LUdecomposition, LeastSquares, LinearSolve, LyapunovSolve, Map, Map2, MatrixAdd, MatrixExponential, MatrixFunction, MatrixInverse, MatrixMatrixMultiply,

(8)

MatrixNorm, MatrixPower, MatrixScalarMultiply, MatrixVectorMultiply, MinimalPolynomial, Minor, Modular, Multiply, NoUserValue, Norm, Normalize, NullSpace, OuterProductMatrix, Permanent, Pivot, PopovForm, ProjectionMatrix, QRDecomposition, RandomMatrix, RandomVector, Rank, RationalCanonicalForm, ReducedRowEchelonForm, Row, RowDimension, RowOperation, RowSpace, ScalarMatrix, ScalarMultiply, ScalarVector, SchurForm, SingularValues, SmithForm, SplitForm, StronglyConnectedBlocks, SubMatrix, SubVector, SumBasis, SylvesterMatrix, SylvesterSolve, ToeplitzMatrix, Trace, Transpose, TridiagonalForm, UnitVector, VandermondeMatrix, VectorAdd, VectorAngle, VectorMatrixMultiply, VectorNorm, VectorScalarMultiply, ZeroMatrix, ZeroVector, Zip]

> *Orbk*(2, z, (1 - z[1]) · (1 - z[2]), [2.5, 2.7], 1000, 1010)
 [0.3819660113, 0.3819660113, 0.3819660112, 0.3819660113, 0.3819660113, 0.3819660112,
 0.3819660113, 0.3819660113, 0.3819660112, 0.3819660113, 0.3819660113] **(9)**

> *F* := *ToSys*(2, z, (1 - z[1]) · (1 - z[2]), [2.5, 2.7]);
 F := [(1 - z₁) (1 - z₂), z₁], [2.5, 2.7] **(10)**

> *SFP2*([(1 - z₁) (1 - z₂), z₁], z[1], z[2]);
 [[0.3819660113, 0.3819660113]] **(11)**

>