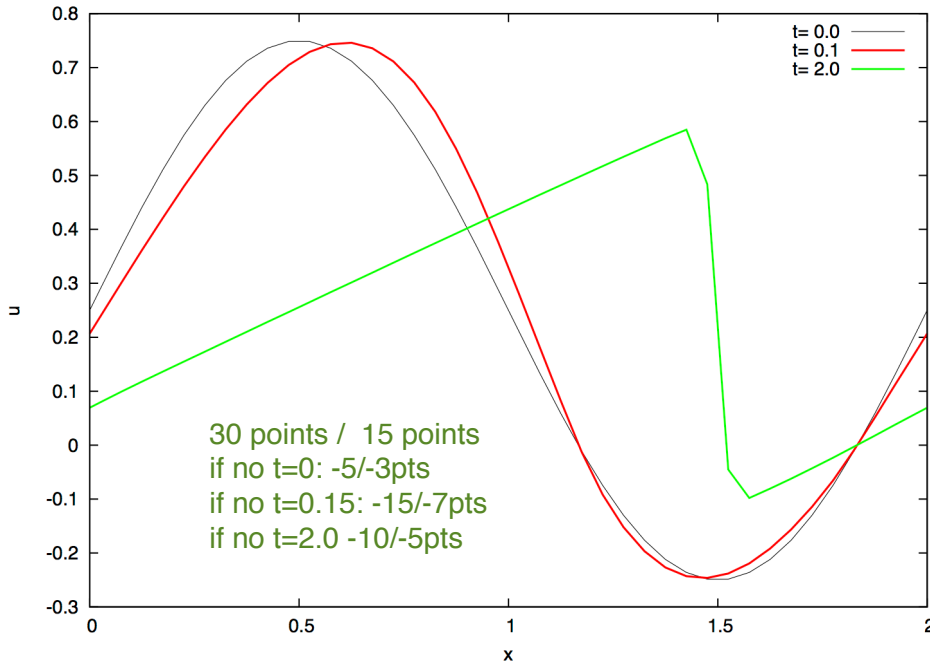


## Homework 9 Solution

Task 1a,b,c ( 100 points / 50 points)



20 points / 10 points

TVD1	C	Linf	L1	order Linf	order L1
40	0.8	7.9505E-03	3.0265E-03		
80	0.8	4.5884E-03	1.5210E-03	0.793	0.993
160	0.8	2.4665E-03	7.5405E-04	0.896	1.012
320	0.8	1.2673E-03	3.7721E-04	0.961	0.999
640	0.8	6.4186E-04	1.8760E-04	0.981	1.008
1280	0.8	3.2372E-04	9.3924E-05	0.988	0.998

order must be at least 0.95, i.e. the mesh should be more than 160.  
 -(5pts /3pts) if mesh is only up to 160 and order > 0.85 but < 0.95  
 -(10pts/5pts) if order < 0.85  
 missing C or delta t: -5pts/-3pts

Code: 30 points / 15 points

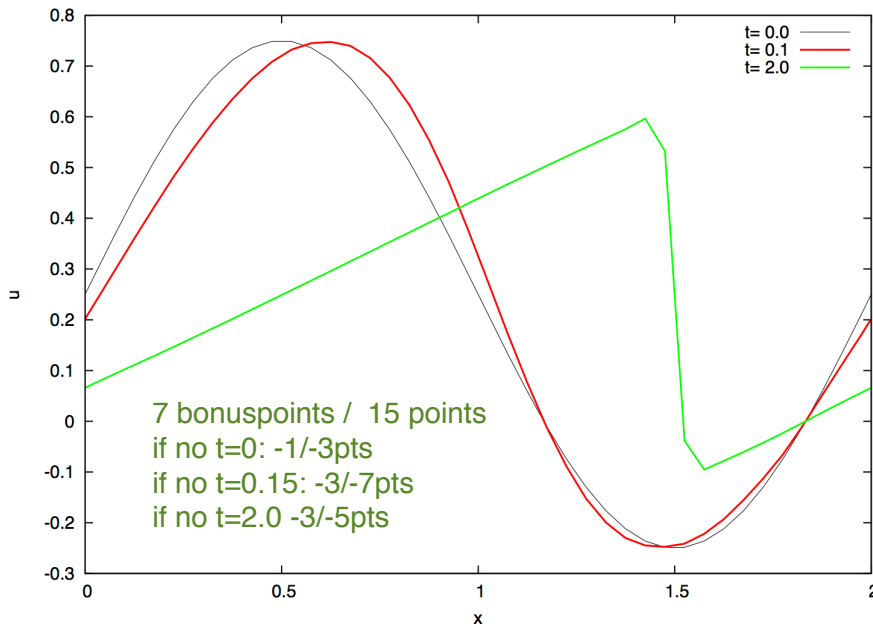
## TVD-1

x	t=0.15	t=2.0
-2.500E-02	1.757569E-01	5.912550E-02
2.500E-02	2.380484E-01	7.929020E-02
7.500E-02	3.002796E-01	9.880102E-02
1.250E-01	3.617671E-01	1.177360E-01
1.750E-01	4.218055E-01	1.363856E-01
2.250E-01	4.796529E-01	1.548951E-01
2.750E-01	5.345075E-01	1.733305E-01
3.250E-01	5.854852E-01	1.917233E-01
3.750E-01	6.315979E-01	2.100891E-01
4.250E-01	6.717362E-01	2.284347E-01
4.750E-01	7.046600E-01	2.467626E-01
5.250E-01	7.290043E-01	2.650724E-01
5.750E-01	7.433081E-01	2.833624E-01
6.250E-01	7.460781E-01	3.016296E-01
6.750E-01	7.358958E-01	3.198703E-01
7.250E-01	7.115727E-01	3.380804E-01
7.750E-01	6.723466E-01	3.562552E-01
8.250E-01	6.180999E-01	3.743895E-01
8.750E-01	5.495628E-01	3.924775E-01
9.250E-01	4.684535E-01	4.105132E-01
9.750E-01	3.775076E-01	4.284895E-01
1.025E+00	2.803616E-01	4.463989E-01
1.075E+00	1.812855E-01	4.642327E-01
1.125E+00	8.193562E-02	4.819814E-01
1.175E+00	-1.285619E-02	4.996337E-01
1.225E+00	-9.193625E-02	5.171772E-01
1.275E+00	-1.522367E-01	5.345969E-01
1.325E+00	-1.967282E-01	5.518751E-01
1.375E+00	-2.267759E-01	5.689834E-01
1.425E+00	-2.429766E-01	5.847524E-01
1.475E+00	-2.463276E-01	4.835519E-01
1.525E+00	-2.380537E-01	-4.528414E-02
1.575E+00	-2.194711E-01	-9.806148E-02
1.625E+00	-1.918917E-01	-8.059938E-02
1.675E+00	-1.565592E-01	-6.227957E-02
1.725E+00	-1.145317E-01	-4.319284E-02
1.775E+00	-6.563315E-02	-2.343478E-02
1.825E+00	-9.830005E-03	-3.124002E-03
1.875E+00	5.116230E-02	1.760138E-02
1.925E+00	1.139363E-01	3.847761E-02
1.975E+00	1.757569E-01	5.912550E-02
2.025E+00	2.380484E-01	7.929020E-02

20 points / 10 points

## Homework 9 Solution

### Task 1d (20 bonus points / 50 points)



5 bonuspoints / 10 points

TVD2	C	Linf	L1	order Linf	order L1
40	0.8	2.8809E-03	7.7024E-04		
80	0.8	1.0350E-03	2.1722E-04	1.477	1.826
160	0.8	4.0221E-04	5.7885E-05	1.364	1.908
320	0.8	1.7151E-04	1.5383E-05	1.230	1.912
640	0.8	7.2083E-05	3.9553E-06	1.251	1.959
1280	0.8	3.0025E-05	1.0156E-06	1.264	1.961

order must be at least 1.91 for L1, i.e. the mesh should be more than 160.  
 -(1pts /3pts) if mesh is only up to 160 and order > 1.80 but < 1.95  
 -(3pts/5pts) if order < 1.80  
 missing C or delta t: -1pts/-3pts

Code: 5 bonuspoints / 15 points

## TVD-2

x	t=0.15	t=2.0
-7.500000E-02	1.110374E-01	3.698160E-02
-2.500000E-02	1.707288E-01	5.638450E-02
2.500000E-02	2.331545E-01	7.516506E-02
7.500000E-02	2.965857E-01	9.330914E-02
1.250000E-01	3.596890E-01	1.109702E-01
1.750000E-01	4.218341E-01	1.286263E-01
2.250000E-01	4.816288E-01	1.465265E-01
2.750000E-01	5.373692E-01	1.647058E-01
3.250000E-01	5.886600E-01	1.831273E-01
3.750000E-01	6.351844E-01	2.017389E-01
4.250000E-01	6.752856E-01	2.204918E-01
4.750000E-01	7.081863E-01	2.393449E-01
5.250000E-01	7.322919E-01	2.582658E-01
5.750000E-01	7.450811E-01	2.772294E-01
6.250000E-01	7.474567E-01	2.962167E-01
6.750000E-01	7.399320E-01	3.152140E-01
7.250000E-01	7.158967E-01	3.342128E-01
7.750000E-01	6.772661E-01	3.532106E-01
8.250000E-01	6.232937E-01	3.722180E-01
8.750000E-01	5.543164E-01	3.912833E-01
9.250000E-01	4.716634E-01	4.103841E-01
9.750000E-01	3.759293E-01	4.293958E-01
1.025000E+00	2.747448E-01	4.482444E-01
1.075000E+00	1.729315E-01	4.669270E-01
1.125000E+00	7.581237E-02	4.854492E-01
1.175000E+00	-1.302768E-02	5.038090E-01
1.225000E+00	-8.960866E-02	5.220170E-01
1.275000E+00	-1.528320E-01	5.401146E-01
1.325000E+00	-1.995662E-01	5.578000E-01
1.375000E+00	-2.300643E-01	5.757197E-01
1.425000E+00	-2.447778E-01	5.966633E-01
1.475000E+00	-2.475746E-01	5.328874E-01
1.525000E+00	-2.413442E-01	-3.829287E-02
1.575000E+00	-2.217918E-01	-9.538941E-02
1.625000E+00	-1.929440E-01	-7.818554E-02
1.675000E+00	-1.552649E-01	-6.068694E-02
1.725000E+00	-1.129916E-01	-4.245484E-02
1.775000E+00	-6.562790E-02	-2.330720E-02
1.825000E+00	-9.844231E-03	-3.316684E-03
1.875000E+00	5.109423E-02	1.699953E-02
1.925000E+00	1.110374E-01	3.698160E-02
1.975000E+00	1.707288E-01	5.638450E-02
2.025000E+00	2.331545E-01	7.516506E-02
2.075000E+00	2.965857E-01	9.330914E-02

3 bonuspoints / 10 points