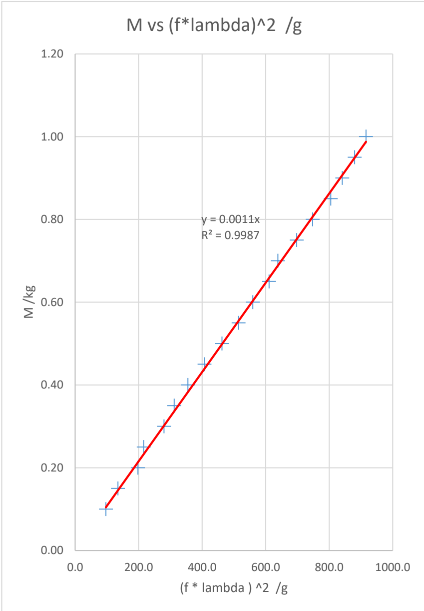
MELDE'S EXPERIMENT (STANDING WAVE RESONANCE IN A VIBRATING STRING)

Andrew French. Winchester College P5. 3/11/2020.

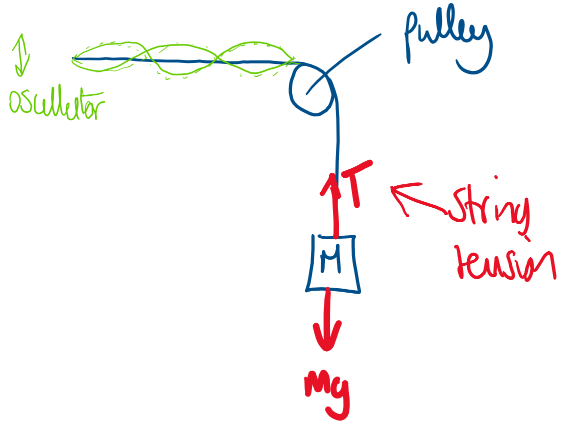
g /Nkg^-1 9.81

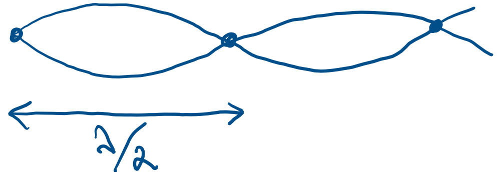
M /kg	Inter node separation /cm	f /Hz	wavelength /m	(f*lambda)^2 /g
0.10	41.4	37.2	0.828	96.8
0.20	43	51.2	0.860	197.7
0.30	38	68.9	0.760	279.6
0.40	38.2	77.3	0.764	355.1
0.50	39.1	86.1	0.782	462.4
0.60	39.2	94.5	0.784	559.4
0.70	39.3	100.7	0.786	638.6
0.80	39.5	108.4	0.790	747.6
0.90	39.7	114.4	0.794	841.1
1.00	39.4	120.3	0.788	916.0
0.95	39.4	117.9	0.788	879.9
0.85	39.7	111.9	0.794	804.7
0.75	39.4	105.0	0.788	697.8
0.65	39.3	98.5	0.786	610.9
0.55	39.2	90.6	0.784	514.4
0.45	38.3	82.5	0.766	407.4
0.35	37.6	73.6	0.752	312.0
0.25	43	53.5	0.860	216.0
0.15	41.6	43.7	0.832	134.4



Mass per unit length = 0.0011kg/m

Standing waves on a string. • nodes





$c = \sqrt{T/\mu}$ $\quad c = f\lambda$

$T = mg$

For each mass, find a resonance (ie standing wave with fixed nodes)

Measure $\lambda/2$ from node separation and read f

$f^2\lambda^2 = mg/\mu$ $\quad \therefore$ $M = \mu \dfrac{f^2\lambda^2}{g}$