Magnetization versus Temperature in the Mean Field Approximation

```
FindRoot[m == Tanh[m / 0.5], {m, 1}]
```

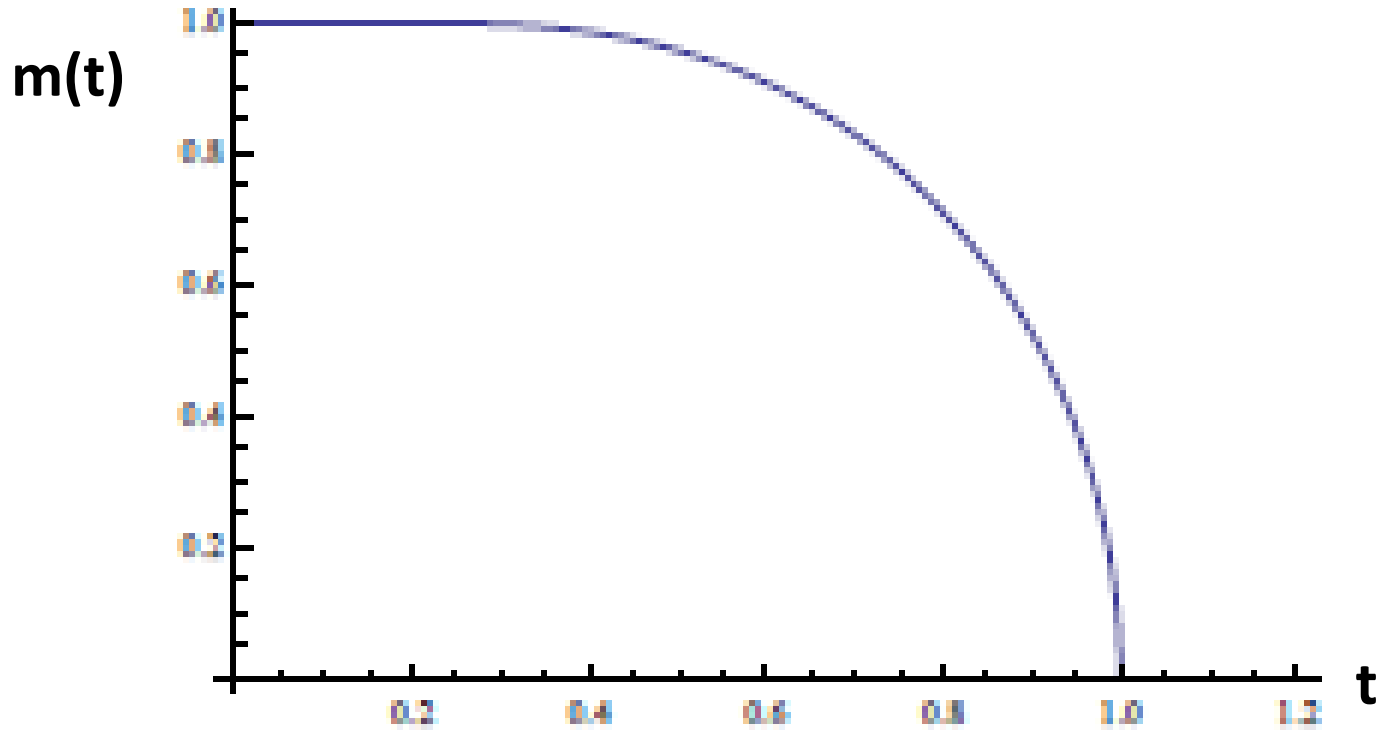
```
{m → 0.957504}
```

```
mag[t_] := m /. FindRoot[m == Tanh[m / t], {m, 1}]
```

```
mag[0.5]
```

```
0.957504
```

```
Plot[mag[t], {t, 0, 1.2}]
```



The Law of Corresponding States in Ferromagnetism

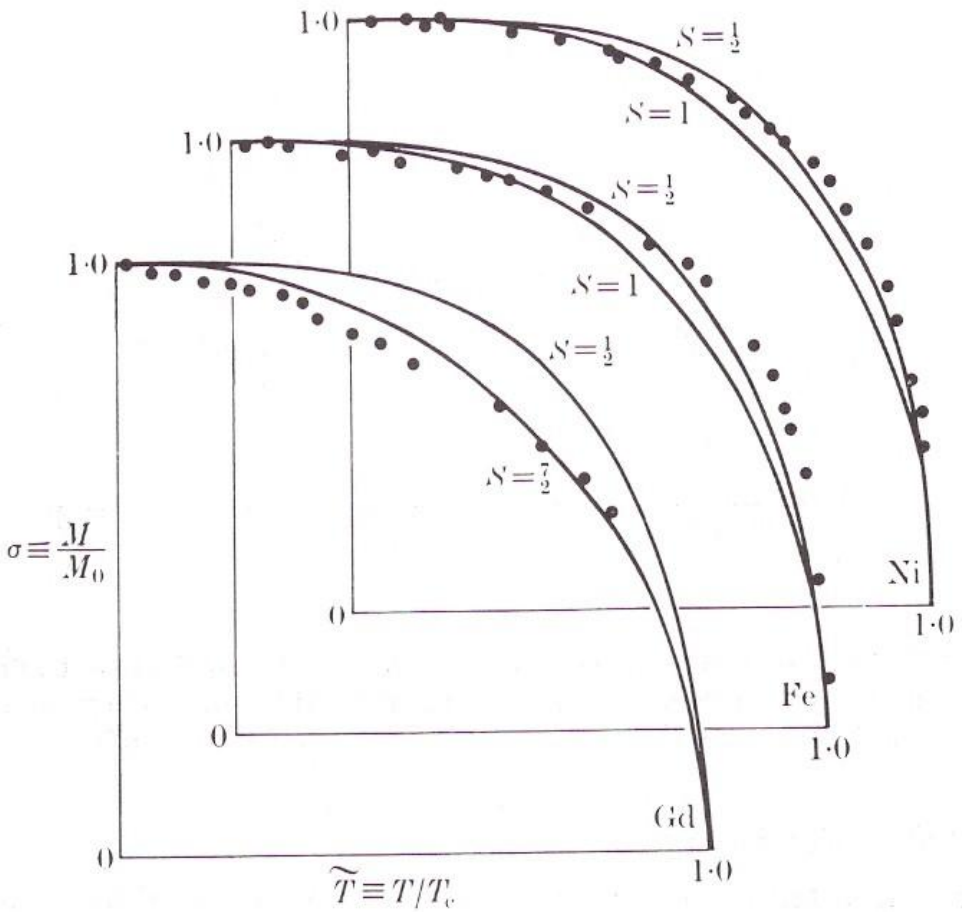


FIG. 6.5. Dependence of reduced magnetization $\sigma \equiv M/M_0 \equiv M(T, H)/M(0, 0)$ upon reduced temperature $\tilde{T} \equiv T/T_c$. The fact that there is a slightly different curve for each value of the spin quantum number S means that this law of corresponding states is valid only for a given value of S. The solid circles represent typical experimental data for Gd ($S \simeq \frac{7}{2}$), Fe ($S \simeq 1$), and Ni ($S \simeq \frac{1}{2}$). After Martin (1967).

H. E. Stanley, Intro. To Phase Transitions and Critical Phenomena, p. 88