Doniach and Wohlfarth[4] evaluate the saturation moment μ per Fe atom at zero temperature in a dilute ferromagnetic alloy of Fe in Pd. They show that the giant moment μ is

$$\mu = \mu_o(1+JX) \ , \qquad (1)$$

where J is a normalized exchange interaction parameter and X is the atomic susceptibility of the Pd matrix. Thus the volume derivative of μ is

$$\frac{\partial \ln \mu}{\partial \ln V} = \frac{J}{1+J} \left(\frac{\partial \ln J}{\partial \ln V} + \frac{\partial \ln X}{\partial \ln V} \right) , \qquad (2)$$

since the moment μ_o on the Fe atom is assumed to be independent of volume.

The magnetostriction quadratic in field associated with the paramagnetism of pure Pd provides an estimate of $\frac{\partial \ln X}{\partial \ln V}$. The volume magnetostriction linear in field of the ferromagnetic PdFe alloys provides an estimate of $\frac{\partial \ln \mu}{\partial \ln V}$ through the thermodynamic relation,

$$\frac{1}{V} \frac{\partial V}{\partial H} = - \frac{1}{\Omega_c} \frac{\partial \mu}{\partial P} = + \frac{\kappa \mu}{\Omega_c} \frac{\partial \ln \mu}{\partial \ln V} \ , \qquad (3)$$

where Ω_c in the volume per Fe atom and κ is the compressibility, which we assume equal to that of pure Pd (5.24×10^{-4} bar^{-1}). The ratio $JX/(1+JX)$ may be estimated from measurements of the saturation magnetization of the PdFe alloy and we obtain a value of $\partial \ln J / \partial \ln V$ by substitution in Eq. (2).