the pressure dependence of T_c requires knowledge of the pressure dependencies of T_F, $N(\epsilon_F)$, and I. In the following discussion we shall make some assumptions as to the nature of I and $N(\epsilon_F)$.

Let us assume that the FM behavior can be described by the Hubbard model[16] for a single, nondegenerate, d-band orbital, such as discussed by Evenson et al.,[17] where the bare intra-atomic exchange constant is replaced by an effective intra-atomic exchange which takes into account the individual electron correlations. In general we assume that I is a compositionally averaged constant in the case of the FM behavior of alloys. For the $MnAs_xSb_{1-x}$ solid solutions considered in this paper, I is the effective exchange appropriate for the Mn atoms. Using double time Green's function techniques and decoupling in first order, the exchange splitting is the assumed $nI\zeta$.[18] We assume that I can be found by means of a perturbation treatment such as used by Lang and Ehrenreich[15] or by Kanamori,[19] and we write I as given approximately by[12,13,15,19]

$$I = I_b \, (1 + \gamma I_b/W)^{-1} \quad , \tag{6}$$

where I_b is the bare interaction, W is the bandwidth and γ is a constant. In addition we assume that the number of magnetic electrons n remains constant,[20] consequently $N(\epsilon_F)$ can be written as[12,13]

$$N(\epsilon_F) = \beta/W \quad , \tag{7}$$

where β is another constant and is related to γ. It is implied that W and thus $N(\epsilon_F)$ scale uniformly (uniform scaling assumption) under volume changes. Finally, we assume the volume dependence of W is given by Heine's[21] results

$$\partial \ln W/\partial \ln V = - 5/3 \quad . \tag{8}$$

Using the above results, Eqs. (6)-(8), the volume dependence of $\bar{I}$, Eq. (4), is

$$\frac{\partial \ln \bar{I}}{\partial \ln V} = \left[\frac{5}{3} + \frac{\partial \ln I_b}{\partial \ln V}\right] \frac{I}{I_b} \quad , \tag{9}$$

which is independent of β and γ and where here I_b is assumed volume dependent. For the density of states of the form given by Eq. (7), it can be shown that $T_F \sim W$, and hence from Eq. (8), $\partial \ln T_F/\partial \ln V = -5/3$. Using Eqs. (3), (4), (8) and (9) the volume dependence of T_c becomes

$$\partial \ln T_c/\partial \ln V \equiv \Gamma$$

$$= -\frac{5}{3} + \frac{1}{2}\left[\frac{5}{3} + \partial \ln I_b/\partial \ln V\right] [\bar{I} - 1]^{-1}(I/I_b) \quad , \tag{10}$$

or equivalently using Eq. (3)

$$\Gamma = -\frac{5}{3} + \frac{1}{2}\left[\frac{5}{3} + \partial \ln I_b/\partial \ln V\right] (I/\bar{I}I_b)\,(T_F{}^2/T_c{}^2) \,. \tag{11}$$

In terms of pressure, Eq. (11) can be written as

$$\partial T_c/\partial P = \frac{5}{3}\varkappa T_c + \frac{1}{2}\varkappa\left[\frac{5}{3} + \partial \ln I_b/\partial \ln V\right] (I/\bar{I}\, I_b)\,(T_F{}^2/T_c) \quad , \tag{12}$$

where $\varkappa$ is the volume compressibility.

We shall now show how pressure measurements of T_c can be used to determine a maximum value for $\bar{I}$ and a minimum value for T_F. We can rewrite Eq. (10) as

$$\bar{I} - 1 = \frac{1}{2}\left[\frac{5}{3} + \partial \ln I_b/\partial \ln V\right](I/I_b)\left[\Gamma + \frac{5}{3}\right]^{-1} \,. \tag{13}$$