$$f_1(\theta_1,\theta_2,\varphi) = \cos^2\theta_1\cos^2\theta_2$$

$$f_2(\theta_1,\theta_2,\varphi) = \frac{1}{2}\sin^2\theta_1\sin^2\theta_2(1+\cos 2\varphi)$$

$$f_3(\theta_1,\theta_2,\varphi) = \frac{1}{2}\sin^2\theta_1\sin^2\theta_2(1-\cos 2\varphi)$$

$$f_4(\theta_1,\theta_2,\varphi) = \frac{1}{2\sqrt{2}}\sin 2\theta_1\sin 2\theta_2\cos\varphi$$

$$f_5(\theta_1,\theta_2,\varphi) = \frac{-1}{2\sqrt{2}}\sin 2\theta_1\sin 2\theta_2\sin\varphi$$

$$f_6(\theta_1,\theta_2,\varphi) = -\sin^2\theta_1\sin^2\theta_2\sin 2\varphi$$

$$\int_{-1}^{1}\sin 2\theta d(cos\theta) = \int_{-1}^{1} 2sin\theta cos\theta d(cos\theta) =$$

$$= \int_{-1}^{1} 2\sqrt{1-cos^2\theta}cos\theta d(cos\theta) = -\frac{2}{3}(1-cos^2\theta)^{3/2}|_{-1}^{1} = 0$$

$$\int_{-1}^{1} cos^2\theta dcos\theta = \frac{1}{3}cos^3\theta|_{-1}^{1} = \frac{2}{3}$$

$$\int_{-1}^{1} sin^2\theta dcos\theta = \int_{-1}^{1}(1-cos^2\theta dcos\theta =$$

$$= (cos\theta - \frac{1}{2}cos^3\theta)|_{-1}^{1} = 2-\frac{2}{3} = \frac{4}{3}$$

$$f_1(\varphi) = \frac{4}{9}$$

$$f_2(\varphi) = \frac{4}{9}(1+\cos 2\varphi)$$

$$f_3(\varphi) = \frac{4}{9}(1-\cos 2\varphi)$$

$$f_4(\varphi) = 0$$

$$f_5(\varphi) = 0$$

$$f_6(\varphi) = -\frac{16}{9}\sin 2\varphi$$