$$2\,\langle \sin(\phi-\phi_S)\rangle = A_{UT}^{\sin(\phi-\phi_S)} \equiv 2\,\frac{\displaystyle\int \mathrm{d}\phi\,\mathrm{d}\phi_S\,(\mathrm{d}\sigma^{\uparrow}-\mathrm{d}\sigma^{\downarrow})\,\sin(\phi-\phi_S)}{\displaystyle\int \mathrm{d}\phi\,\mathrm{d}\phi_S\,(\mathrm{d}\sigma^{\uparrow}+\mathrm{d}\sigma^{\downarrow})}$$