**S.2578 If $m\ge 0, t, x, y, z>0$ then in triangle $ABC$ holds:**

$$\frac{y^{t+1}+z^{t+1}}{x^{t+1}}a^{m+1}+\frac{z^{t+1}+x^{t+1}}{y^{t+1}}b^{m+1}+\frac{x^{t+1}+y^{t+1}}{z^{t+1}}c^{m+1}\ge 2^{m+2}3^{\frac{3-m}{4}}\left(\sqrt{F}\right)^{m+1}$$

*Proposed by D.M.Bătinețu-Giurgiu, Claudia Nănuți – Romania*

*Solution by Titu Zvonaru-Romania*

We denote $m=x^{t+1}, n=y^{t+1}, p=z^{t+1}$. Applying $AM-GM$ inequality, Cesaro's inequality $(m+n)(n+p)(p+m)\ge 8mnp$ and Carlitz's inequality $(abc)^{\frac{2}{3}}\ge\frac{4}{3}\sqrt{3}F$, it follows that

$$\frac{y^{t+1}+z^{t+1}}{x^{t+1}}a^{m+1}+\frac{z^{t+1}+x^{t+1}}{y^{t+1}}b^{m+1}+\frac{x^{t+1}+y^{t+1}}{z^{t+1}}c^{m+1}=$$

$$=\frac{n+p}{m}a^{m+1}+\frac{p+m}{n}b^{m+1}+\frac{m+n}{p}c^{m+1}\ge$$

$$\ge 3\left(\frac{n+p}{m}a^{m+1}\cdot\frac{p+m}{n}b^{m+1}\cdot\frac{m+n}{p}c^{m+1}\right)^{\frac{1}{3}}\ge$$

$$\ge 3\left(8(abc)^{m+1}\right)^{\frac{1}{3}}\ge 3\cdot 2\left(\frac{4}{3}\sqrt{3}F\right)^{\frac{m+1}{2}}=2^{m+2}3^{\frac{3-m}{4}}\left(\sqrt{F}\right)^{m+1}.$$

Equality holds if and only if the triangle $ABC$ is equilateral and $x=y=z$.