CSE Computer Graphics Quiz 5 UTA

The equation of a parametric bi-cubic curved surface is given:

$$S(u,v) = 2u^3v^3 - 6u^3 - 5v^3 + 7uv + 9$$

Find the numerical value of the Hermite geometry matrix for this surface.

$$\frac{dS}{du} = 6u^2v^3 - 18u^2 + 7v$$
$$\frac{dS}{dv} = 6u^3v^2 - 15v^2 + 7u$$
$$\frac{dS}{dudv} = 18u^2v^2 + 7$$

$$[G_S] = \begin{bmatrix} S_{00} & S_{01} & \frac{dS_{00}}{dv} & \frac{dS_{01}}{dv} \\ S_{10} & S_{11} & \frac{dS_{10}}{dv} & \frac{dS_{11}}{dv} \\ \frac{dS_{00}}{du} & \frac{dS_{01}}{du} & \frac{dS_{00}}{dudv} & \frac{dS_{01}}{dudv} \\ \frac{dS_{10}}{du} & \frac{dS_{11}}{du} & \frac{dS_{10}}{dudv} & \frac{dS_{11}}{dudv} \end{bmatrix}$$

$$[G_S] = \begin{bmatrix} 9 & 4 & 0 & -15 \\ 3 & 7 & 7 & -2 \\ 0 & 7 & 7 & 7 \\ -18 & -5 & 7 & 25 \end{bmatrix}$$