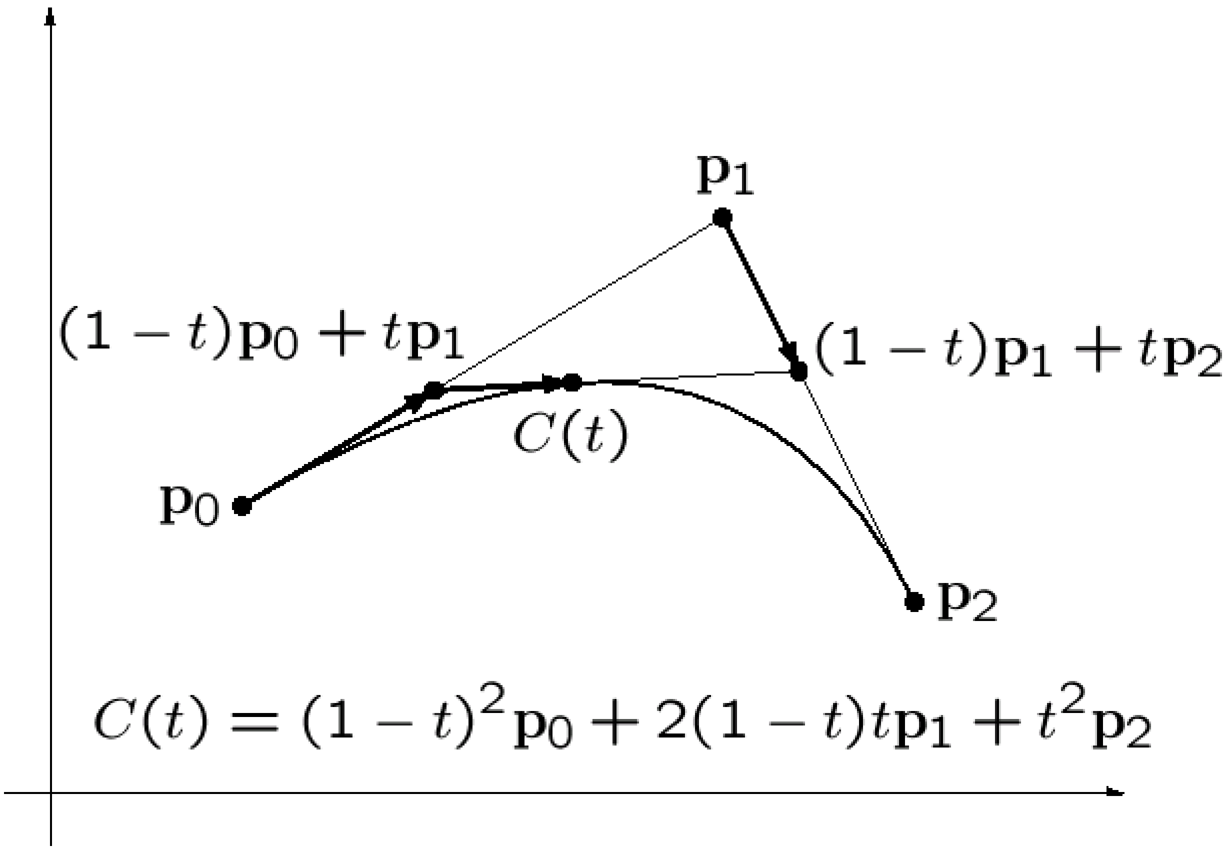
2차 Bezier Curve

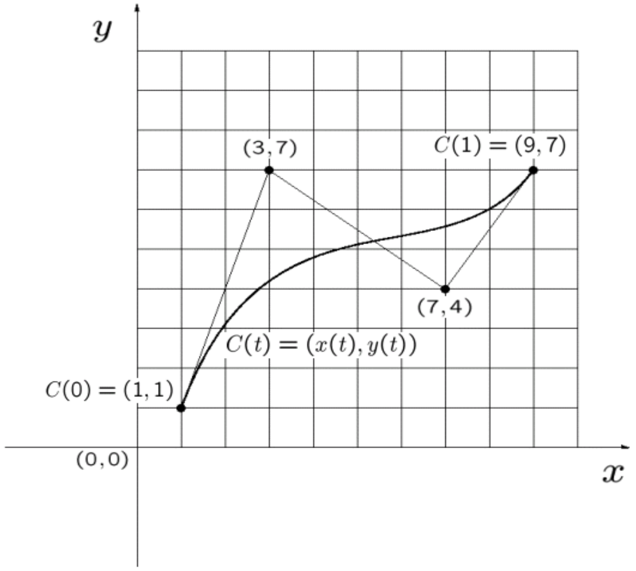


3차 Bezier Curve

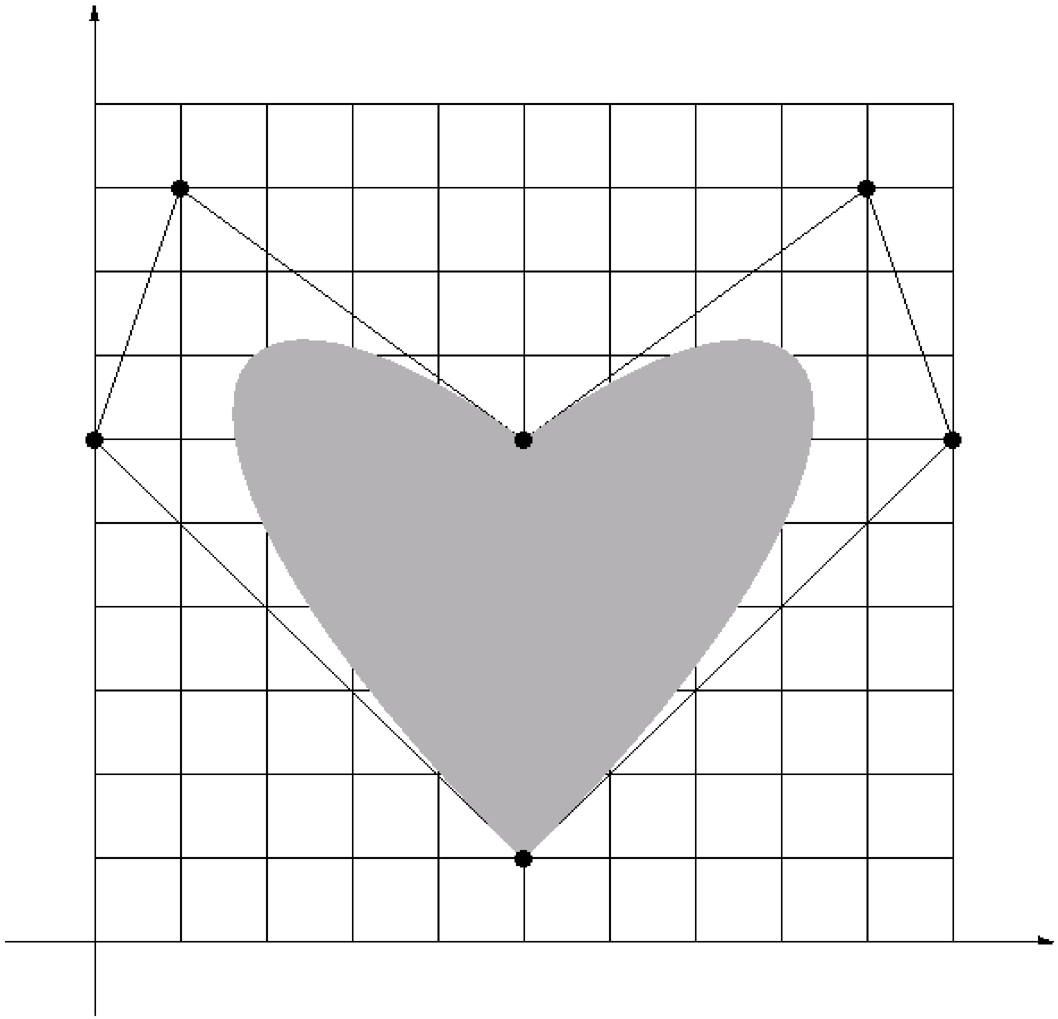
$$\begin{aligned} C(t) &= (1-t)^3\,\mathbf{p}_0 + 3(1-t)^2t\,\mathbf{p}_1 \\ &\quad +3(1-t)t^2\,\mathbf{p}_2 + t^3\,\mathbf{p}_3 \end{aligned}$$

$$\begin{aligned} x(t) &= (1-t)^3 + 9(1-t)^2t \\ &\quad +21(1-t)t^2 + 9t^3 \\ &= -4t^3 + 6t^2 + 6t + 1 \end{aligned}$$

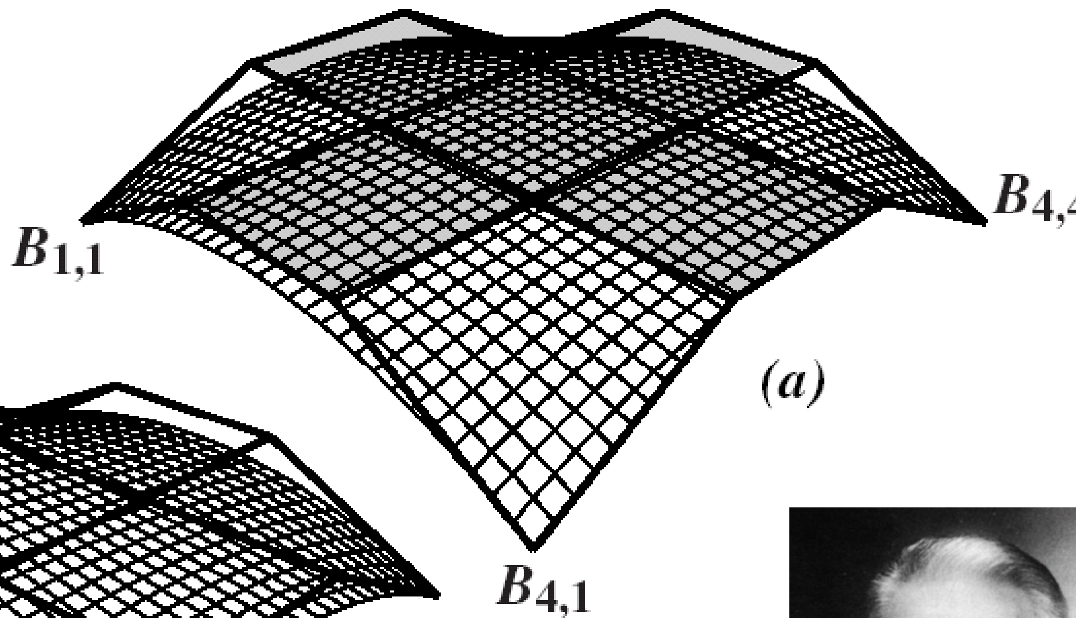
$$\begin{aligned} y(t) &= (1-t)^3 + 21(1-t)^2t \\ &\quad +12(1-t)t^2 + 7t^3 \\ &= 15t^3 - 27t^2 + 18t + 1 \end{aligned}$$

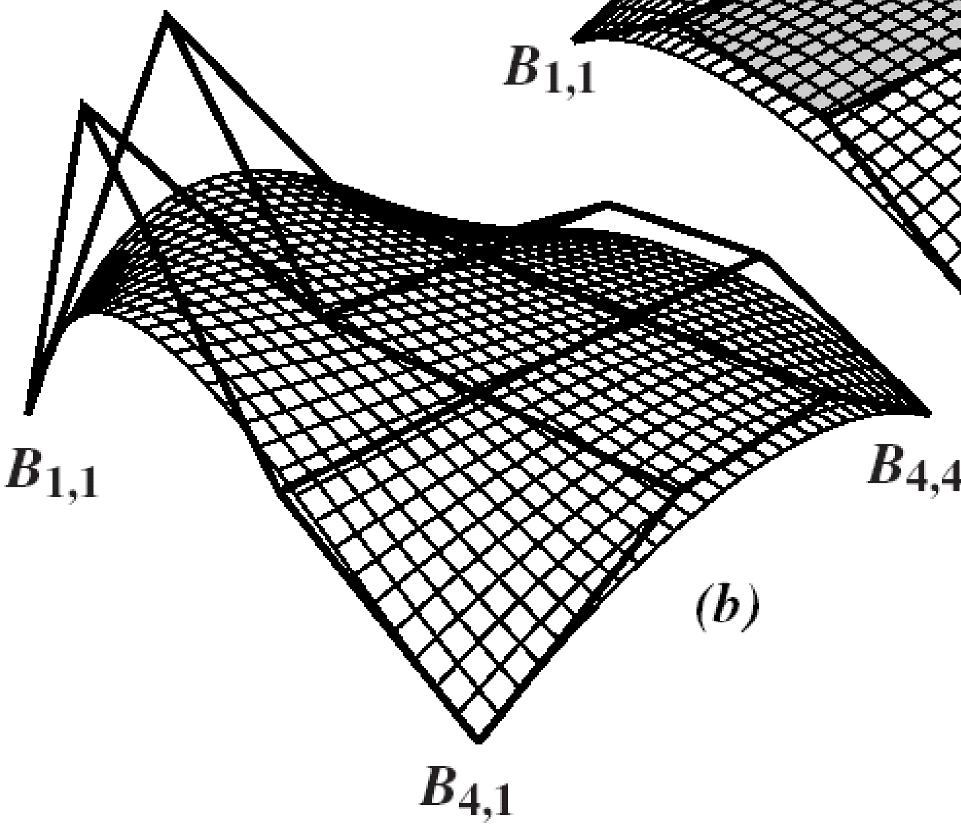


곡선을 이용한 도형디자인

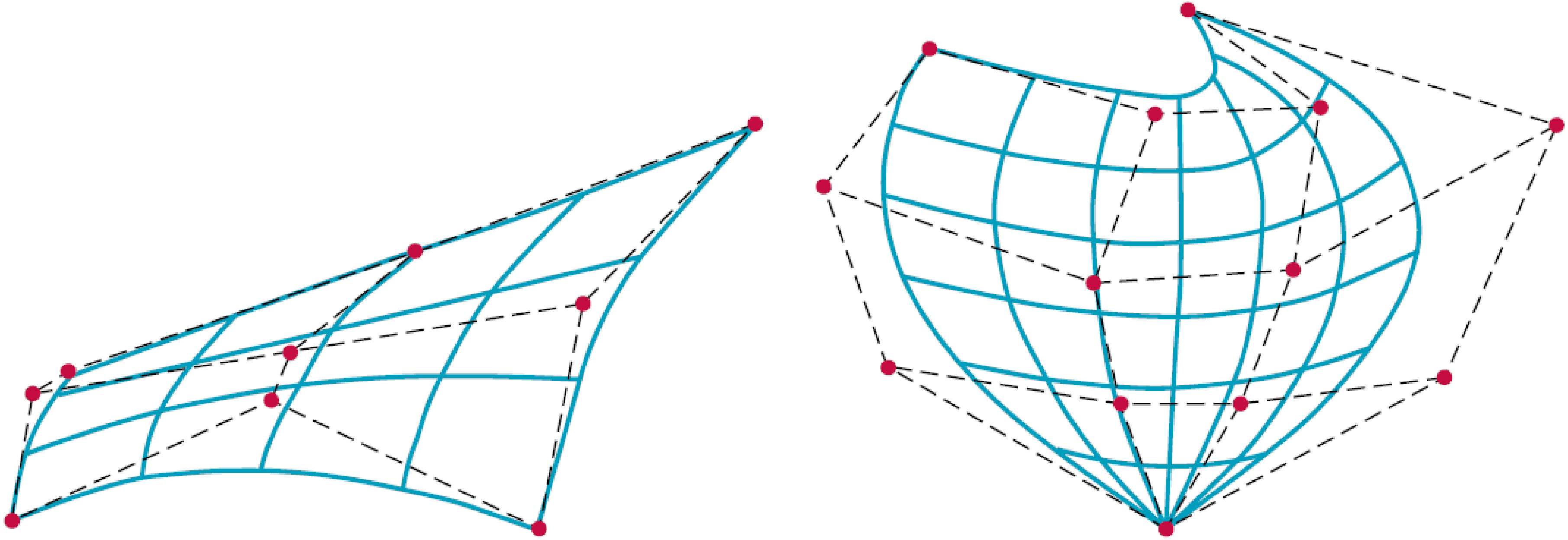


Bezier Surfaces





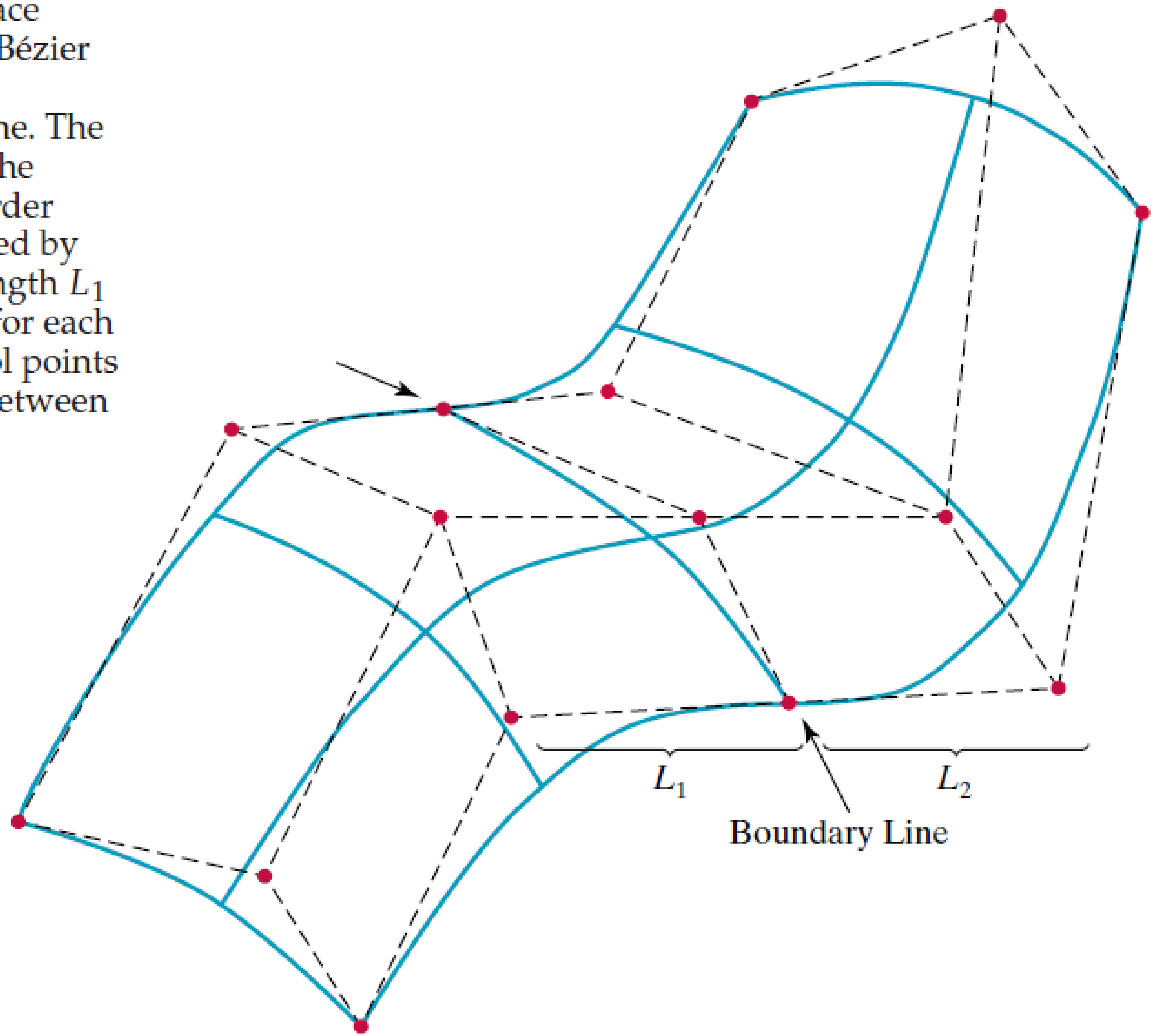
Pierre Bezier



(a) (b)

FIGURE 8–39 Wire-frame Bézier surfaces constructed with (a) nine control points arranged in a 3 by 3 mesh and (b) sixteen control points arranged in a 4 by 4 mesh. Dashed lines connect the control points.

FIGURE 8-40 A composite Bézier surface constructed with two Bézier sections, joined at the indicated boundary line. The dashed lines connect the control points. First-order continuity is established by making the ratio of length L_1 to length L_2 constant for each collinear line of control points across the boundary between the surface sections.



$$
\begin{aligned}
S(u,v) &= \sum_{i=0}^{3}\sum_{j=0}^{3} \mathbf{p}_{ij} B_i^3(u) B_j^3(v) \\
&= \begin{bmatrix} B_0^3(u) & B_1^3(u) & B_2^3(u) & B_3^3(u) \end{bmatrix} \\
&\qquad \begin{bmatrix} \mathbf{p}_{00} & \mathbf{p}_{01} & \mathbf{p}_{02} & \mathbf{p}_{03} \\ \mathbf{p}_{10} & \mathbf{p}_{11} & \mathbf{p}_{12} & \mathbf{p}_{13} \\ \mathbf{p}_{20} & \mathbf{p}_{21} & \mathbf{p}_{22} & \mathbf{p}_{23} \\ \mathbf{p}_{30} & \mathbf{p}_{31} & \mathbf{p}_{32} & \mathbf{p}_{33} \end{bmatrix} \begin{bmatrix} B_0^3(v) \\ B_1^3(v) \\ B_2^3(v) \\ B_3^3(v) \end{bmatrix}
\end{aligned}
$$

$$
\begin{aligned}
B_0^3 = (1-u)^3, B_1^3(u) = 3(1-u)^2 u,& \\
B_2^3(u) = 3(1-u)u^2, B_3^3(u) = u^3&
\end{aligned}
$$