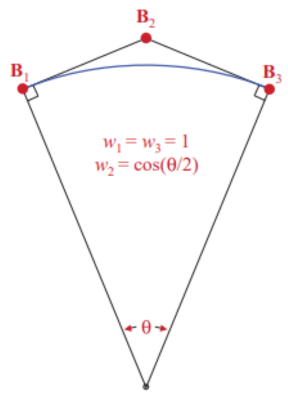
1. NURBS

1.1. Pesos para circunferencias

intersection of the tangent lines passing through the other two points (now we see why this technique only works for arcs of less than 180○). Its weight, w2, is the cosine of half of the angle subtended by the arc. That is, if $\angle B1CB3 = \theta$, where C is the center of the circle, then w2 $= cos(\theta/2)$.



2. Isogeometric analysis

2.1. Problema clasico

$$\begin{aligned} \Delta u + f &= 0 \quad \text{in } \Omega, \\ u &= g \quad \text{on } \Gamma_D, \\ \nabla u \cdot \mathbf{n} &= h \quad \text{on } \Gamma_N, \\ \beta u + \nabla u \cdot \mathbf{n} &= r \quad \text{on } \Gamma_R, \end{aligned}$$

2.2. Formulación debil

$$\int_\Omega \nabla w \cdot \nabla u \, d\Omega + \beta \int_{\Gamma_R} wu \, d\Gamma = \int_\Omega wf \, d\Omega + \int_{\Gamma_N} wh \, d\Gamma + \int_{\Gamma_R} wr \, d\Gamma.$$

2.3. Forma bilineal/ lineal

$$a(w,u) = L(w),$$

Donde:

$$a(w,u) = \int_\Omega \nabla w \cdot \nabla u d\Omega + \beta \int_{\Gamma_R} wud\Gamma,$$
$$L(w) = \int_\Omega \nabla w f d\Omega + \int_{\Gamma_N} whd\Gamma + \int_{\Gamma_R} wrd\Gamma.$$

2.4. Discretización

Galerkin's method consists of constructing finite-dimensional approximations of $\mathcal{S}$ and $\mathcal{V}$, denoted $\mathcal{S}^h$ and $\mathcal{V}^h$, respectively. Strictly speaking, these will be subsets such that

$$\mathcal{S}^h \subset \mathcal{S}, \tag{3.20}$$
$$\mathcal{V}^h \subset \mathcal{V}. \tag{3.21}$$

Furthermore, these will be associated with subsets of the space spanned by the isoparametric basis.

We can further characterize $\mathcal{S}^h$ by recognizing that if we have a *given* function $g^h \in \mathcal{S}^h$ such that $g^h|_{\Gamma_D} = g$, then for every $u^h \in \mathcal{S}^h$ there exists a unique $v^h \in \mathcal{V}^h$ such that

$$u^h = v^h + g^h. \tag{3.22}$$

2.5. Forma bilineal/ lineal discretas

$$a(w^h, u^h) = L(w^h) \implies a(w^h, v^h) = L(w^h) - a(w^h, g^h)$$